

# AVIATION WEEK

A MCGRAW-HILL PUBLICATION

MARCH 22, 1948



stresses **BG** dependability  
for Hawaiian Service . . .

Veteran of over fifty million miles of Pacific Ocean Flying for the U. S. Government, in which **BG** aviation spark plugs were used exclusively, United Air Lines continues to use **BG** plugs for its 2400 mile overwater service to Hawaii.

Here, where dependability is especially a factor, United engineers specify **BG** plugs. All other United Mainliners and Cargoliners are similarly equipped.

FOR AIRCRAFT ENGINES...AIRCRAFT SPARK PLUGS

**THE BG CORPORATION**

NEW YORK 19, N. Y.

SERVING WORLD AVIATION OVER THIRTY YEARS





## Safer Flying WITH Thompson Sodium-Cooled Valves



AIR TRANSPORTS could not develop their present power nor safely cover their vast distances without sodium-cooled valves. Since Thompson first manufactured the sodium-cooled valve, constant research has produced new valve steels and methods, and aircraft valve life has steadily multiplied from the few flying hours of three decades ago to the many thousands of hours recorded by Thompson Aircraft Valves in regular operation today.

A Thompson Sodium-Cooled Aircraft Valve, so simple-looking in its perfect contour and finish, represents many engineering achievements in design, chemistry, metallurgy and production.

Hundreds of extreme precision operations of forging, machining, heat-treating and inspection go into each valve before the final test is ready for its vital responsibility.

That's why safety-minded aircraft engine builders and airline operators use Thompson Sodium-Cooled Valves so universally.

**Thompson Products, Inc.**



CLEVELAND • DETROIT • LOS ANGELES

Precision Parts for Aircraft and Automotive Industries, Manufacturers of the Thompson Thompson Sodium-Cooled Valve; Builders of Valves, Blades and Assemblies for Jet and Turbo Propulsion Engines



## They added wheels to subtract weight

TO trim the Navy's Constitution to fighting weight, Lockheed design engineers needed the lightest possible landing gear equipment. At the same time, that equipment had to provide maximum safety and comfort for the 180 passengers carried by the long range transport.

Solving the problem, B. F. Goodrich and Lockheed engineers came up with a new design—conform wheels for the main landing gear, dual for the nose. That's 20 wheels in all. By using more—and smaller—wheels, engineers shaved a ton off the Constitution's weight!

In addition, B. F. Goodrich tandem twin wheels have five other big ad-

vantages: 1) greater safety—if one of the four tires goes flat, the pilot is control of the plane is unaffected, 2) greater strength—even in landings with one twin tire flat, the wheel and often the tire are still good for additional service, 3) more comfort—with four air chambers, landings are smoother, 4) better design—the four small wheels take up less space when retracted, 5) better load distribution—with the load distributed over a greater area, very thick runways are not needed, more airports can be used.

Besides multiple wheels—a 10-year development project of B. F. Goodrich engineers—the Constitution also uses B. F. Goodrich Ex-

pander Tube brakes and Rotovane tires. Expander Tube brakes are simpler in design, lighter in weight and easier to maintain than other brakes. Rotovane tires—the first commercial pre-rotation tires—reduce landing shock, lengthen tire life and make possible lighter landing gear.

All these developments are the result of B. F. Goodrich research—the research that works constantly for better and safer flight. The B. F. Goodrich Company, Akron, Ohio.

**B.F. Goodrich**  
FIRST IN RUBBER









Cherry rivets solve many of the difficult fastening problems on the Douglas DC-4 transport.

## CHERRY BLIND RIVETS

MAKE THE HARD JOBS EASY

**SPECIAL CHARACTERISTICS** of Cherry Blind rivets give you a better blind-fastening process on assembly lines. Cherry Rivets are designed with more shock resistance... that means lighter, vibration-resistant joints. They have greater hole-diameter and grip-length tolerances... that means more latitude for all types of assembly jobs. Cherry Rivets are available in more rivet types, greater range of diameters, and in the largest number of grip lengths for covering production lines.

**AS SIMPLE AS DRIVING NAILS.** No washers, locking



Look at the rivets in the drill bit below. With the gun, put the rivet through the hole into the plate to be fastened and form a "blind head" on the other side of the work.

devices, or nuts need be handled again and again in time-consuming steps. Cherry Rivets provide a fast, one fastening method that makes them a "production-line standard" in the aviation industry. Cherry Riveting is a production aid of the job process. Only one man is needed... there's no "backing" with Cherry Rivets. It's controlled pull instead of pounding with Cherry Blind Riveting.

**UNEQUALLED FOR MAINTENANCE.** In maintenance work, Cherry Rivets stand alone... unpainted. Easy to install. Easy to remove. Easy to replace. Greater hole-diameter and grip-length tolerances make them superior for maintenance work. Whether for assembly or repair, Cherry Rivets save time. Try Cherry Rivets today and you'll gain years of less-expensive, more dependable assembly work.



Cherry Rivets are made from aluminum alloy steel, or steel. Standard Rivets come in five sizes and two head styles. Cherry is a white color of a bright-finish finish. diameters and lengths, and often are made to order. WRITE US TODAY FOR FURTHER INFORMATION. ROBERT HUBBARD, JR. CHERRY RIVET COMPANY, 100 WILSON STREET, LOS ANGELES 13, CALIFORNIA.

CHERRY RIVETS ARE APPROVED BY CIVIL AERONAUTICS AUTHORITY AND UNDERWRITERS' LABORATORIES, INC.

## Certification of 6 Freight Lines Recommended by CAB Examiners

Route applications by Slick, California Eastern, Flying Tigers, U. S. and Willis favored in report; modified area-to-area operations endorsed.

By CHARLES ADAMS

A certified nationwide network of all-cargo routes connecting the seven most important freight-producing areas in the U. S. has been recommended by CAB examiners.

Notified to operate the new services were five of the country's best-known freight lines—all of which were in long after the war. They are Slick Airways, California Eastern Airways, the Flying Tiger Line, U. S. Airlines and Willis Air Service. Additionally, American, Inc. San Antonio, was recommended for a small all-cargo operation in western Texas.

**Active Operation.** With the exception of U. S., all are currently engaged in domestic cargo freight service under temporary letters of registration issued by CAB. U. S. has had a letter of registration but suspended service last November to conserve capital pending a decision on its bid for a certificate.

CAB was urged to reject applications of one unlicensed carrier, and of other companies seeking all-cargo routes. One such bid was by Capital Airlines (PCAL), which requested new bids to California and the Pacific Northwest. Other bids were by Air West Corp., Los Angeles; American Air Express Corp., Miami, Florida; Lone Star Air Cargo Lines, Air Cargo Transport Corp., Dallas; Air Transport (Air Trans), Los Angeles; and Flying Tiger Airways.

**ATA Sifted.** Chairman of Transportation William F. Connelley and K. Vernon Redcliffe represent a major attack for the Air Transport Association and 11 domestic airlines which are actively opposing establishment of any all-cargo routes. Even so, the report was far from a blanket endorsement of the air freight carrier's aims.

The examiners recommended that the certificate be issued to a three-year period. "It must be recognized," the report declared, "that the experiment may result in a division of cargo

to attain a large enough volume of traffic to make economic operations that would be the case with multiple service carriers which could look to other sources for needed revenue."

In finding that all-cargo routes offer greater promise of developing air freight than do the presently restricted passenger-carrying lines, the examiners took special notice of national defense needs. They decided that military materials are best served by maintenance of transport services on the largest practicable scale, adding that all-cargo lines by developing more freight traffic would work to this end.

**Solely Problem.** The report and it is doubtful whether attention of the freight field to passenger-carried cargo would result in more intensive operations than in need of additional income. It noted that the major air freight lines, which have the greatest dependence on government mail pay, have only limited freight potential over their short-haul routes, and traffic diversion by all-cargo operations would be small.

**Results Recommended.** By the CAB examiners' request in endorsement of the modified nationwide concept of operation advanced by a number of the applicants. Request would be California, the Northwest, North Central, Northeast, Texas, Louisiana and Southeast areas. Denial of all applications seeking conventional point-to-point service was urged by the examiners.

**Traffic Flow.** The report declared that in establishing majority of data introduced in the one showed that the



BRITISH ALL-WEATHER FIGHTER

De Havilland Sea Hornet XN1 carries radar search equipment in special nose. Normally a night-fighter carrier fighter, the version has second eye scanner (below by wing) in its fuselage to operate radar gun. Note flame-throwing equipment on Merlin engine exhaust ducts. Sea Hornet has four 30-mm cannons in fuselage under nose and top speed of better than 450 mph. (Flight photo)



## Congressional Groups Move Slowly Toward Civil Air Shifts

Final decisions on revamping Civil Aeronautics Commission, Civil Aeronautics Board will wait on report of Hoover Reorganization Commission.

Congress moved forward last week with legislation to reorganize departments of government agencies in civil aviation, but seemed to accomplish little more than surface scratching in that controversial field during the present session. Progress for a reorganization of aviation agencies has been the broader theme of a far-reaching reorganization of all government agencies concerned with transportation.

While the Congressional Aviation Policy Board drafted legislation on piecing together its recommendations on reorganization of Civil Aeronautics Administration and Civil Aeronautics Board, a subcommittee of the Senate Interstate and Foreign Commerce Committee completed its first series of hearings on a bill setting up a department of transportation. Subcommittee chairman Sen. Hiram Boren (Rep., Ind.), also author of the department of transportation omnibus and the chairman of the government organization subcommittee of the Aviation Policy Board. Hearings on the bill, vigorously opposed by acting CAB chairman Robert R. Rasmussen, are scheduled for the development of transportation. The bill will be introduced in March.

Aviation Committee — Minnesota,

submitted on Capitol Hill indicates that no re-organization of government agencies of transportation agencies will be effected until the recommendations of the Commission on Organization of the Executive Branch have been made. The Commission, established by Congress and given the mission of working out a modernization of the executive branch, is headed by former President Herbert Hoover, and scheduled to make its recommendations at the beginning of next year.

The Capitol Hill, sitting as a department of transportation headed by a secretary, and under secretary, and three assistant secretaries, was also heard last week by the Senate Interstate and Foreign Commerce Committee. Subcommittee Chairman Hiram Boren also of the Department of Transportation, and Chairman of the Senate Interstate and Foreign Commerce Committee, was also heard last week by the Senate Interstate and Foreign Commerce Committee. That will call for abolition of CAA, with its functions split between the Department of Transportation and the Department of Commerce.

Under Unified Control—Johnson urged unified control of government transportation activities, the general objective of the bill. He pointed out that aviation now deal with 20 government agencies, including with 14 shipping companies

with 27, trucking firms with 17 agencies. Further give Congress Department of Transportation the principle of unification of transportation agencies and activities, but questioned the "realism" of creating the department of transportation, and proposed that additional study of the matter be undertaken.

Ryan's Agreement—Ryan argued that aggressive, independent development of air transportation would be established under unified transportation control. Although the bill would remove the quasi-judicial rate-making and regulatory functions of CAB, ICC, and Maritime Commission from jurisdiction of the top-tier of secretaries of the department of transportation, Ryan proposed that, in practice, they would maintain considerable authority over the regulatory agencies through power to control their personnel and budgets. Smith argued a similar case against loss of independence of control and development for the merchant marine.

The disjunct recommendations reached by the President's Air Policy Commission and the Congressional Aviation Policy Board—both of which made extensive studies of aviation agency organization indicate that Congress will encounter difficulties in arriving at a solution.

Policy Legislation—Legislation corresponding to the recommendations of the Air Policy Board will be introduced in the merchant marine by Congress, and possibly will receive early passage by the Senate Interstate Commerce Committee. That will call for abolition of CAA, with its functions split between the Department of Transportation and the Department of Commerce. In "Office of Civil Aviation" in Commerce would have over airport development and aviation operations. CAA's

current activities in investigation and administration of safety equipment would be lodged in a CAB completely divorced, even for "housekeeping purposes," from Commerce. The act would also include a completely independent director of air safety.

The Air Policy Board's proposals for a completely independent CAB and an air safety director are in conflict with the terms and objectives of the department of transportation bill which would bring CAA and air safety activities under the department and—although giving the Board "independence" on quasi-judicial matters—conceivably constrains the regulatory activities of CAB, ICC, and Maritime by the top structure of structure.

The President's Air Policy Commission's recommendations—which will probably receive its stamp at the time of hearings on the Congressional Aviation Policy Board—call for strengthening, instead of dismantling, Commerce Department's air arm. CAA would be transferred into a department of aviation activities, headed by a secretary who would report to the Secretary of Commerce. Three administrative agencies would be lodged for housekeeping purposes in the department—CAA, an aircraft development corporation, and an air safety board. Ultimately the Commerce Department would be the department of civil aviation evolving into a department of transportation, which, together with a department of industry and trade, would come under a "super secretary" of Commerce.

## Probes Under Way In DC-4 Accidents

Crash of two DC-4 accidents involving a Northwest Airlines charter flight which hit a skyscraper in Alaska and a Delta Air Lines plane which crashed two days earlier after taking off from Chicago Municipal Airport remain under investigation by Congress and the NTSB.

Conditions which led to the NWA crash 280 miles northwest of Anchorage probably will never be ascertained. The shattered plane, carrying 24 persons and a crew of four from Anchorage to New York, lay frozen scattered at an 11,000 ft level killing all aboard. Some investigators said it may be impossible to reach the wreckage, which is in a glaze.

Under Alaska—the charter plane crash on the first fatal accident suffered by NWA on its Alaska-Continent route. One representative of the airline was sharp-eyed from the American Commercial Airlines Association (ACAA).

The crash, with extensive radio operation, led a Delta airline senior official, Northwest, ACAA attacked



NEW SIKORSKY DELIVERED TO NAVY

Latest model Sikorsky, the Navy HO4S-1, a most powerful and best performing version yet produced by the company with 1300 hp, top speed, 17,000 ft ceiling, and 300 mile range. New design is powered by 500 hp Continental, an engine which is 1000 hp. It has a high position of tail rotor and a large main rotor. New all-steel rotor arm with 49 ft. diameter. HO4S-1 features special night flying equipment. (Navy photo)

working conditions, at times on charter flights, "piling it all up to 100 hours on an airplane is too long for a crew member."

Program Made—Meanwhile, CAA and CAB investigations were making some progress in probing the Delta accident, but results will be withheld pending a final hearing to be scheduled shortly. A special civilian's jury failed to learn the cause of the crash, in which 12 of the 13 persons aboard the NWA charter flight were killed.

Traffic control personnel and the tower appeared normal until the plane crashed 100 ft altitude. The plane then reportedly went into an unusual steep climb to about 800 ft, stalled and dropped off to the right.

## Meyers to Appeal

May CAA Boarder E. Meyers was scheduled to serve a 28-month to five-year term for subornation of perjury by federal judge Alexander Holtzoff in Washington. Meyers' attorneys told they would appeal. The general office faces income tax evasion charges as a total of \$26,785 in income and excess profits tax. He began serving his sentence last week in Washington.

## New Flight Training Plan Urged by VATA Group

Virginia Aviation Trade Association committee is studying plans for a national flight training program for young men and women between the ages of 16 and 21. VATA has asked National Aviation Trade Association to convene other state chapters for recommendations on establishment of such a program.

The Virginia group, including newly

elected officers and directors, met recently at Richmond for discussion of the training program, previously sought as a replacement for Civil Flight training program. Officers include W. R. Ashburn, Alexandria, president, T. E. H. Hensley, vice president, Miss Martha Anne Wauson, Rappahannock, secretary, H. P. Gies, Jr., Shenandoah, treasurer, Woody Edmondson, Lynchburg, international secretary, and VATA delegates to the national organization, and R. P. Hensley, Stevens, its legal adviser.

## Cornell Lab Begins Wind Tunnel Operations

The Cornell Aeronautical Laboratory's high-speed wind tunnel, originally begun by Curtiss-Wright Corp., has been in operation since May 1, following more than two years of construction. The \$5,000,000 tunnel has test section 12 ft in diameter and maximum speed of supersonic velocity. It will be used by a group of participating research companies for model tests of individual designs and for Cornell research contracts with various government agencies.

Originally a Curtiss-Wright Division research facility, the laboratory was given to Cornell University in 1946. A total of \$575,000 was expended in working capital for the laboratory by the Army, Navy, United Aircraft, General Aircraft Engineering, Fairchild Engine and Airplane and Aero Manufacturing corporations. In addition for these companies contributed a further \$105,000 for the final construction costs.

The tunnel is powered by 14,000 hp electric motor. It is 175 ft. long, 81 ft. wide and 35 ft. high. The tunnel may be operated by three engineers stationed at a large control panel with the aid of automatic recording apparatus.



RESEARCH LEADERS CONVENE

Shown above are members of the National Advisory Committee for Aeronautics at their recent meeting in Washington. D. C. Left to right are John W. Cowley (NACA), Ronald M. Bates (Albany), Arthur J. Rosenfeld (General), Bryn Adams (T. C. Lawrence), John A. May (C. I. Group), R. J. Rasmussen (Boeing), Joseph J. Clark (Office of DCA), General Carl Spaatz (USAF), Dr. Vincent Bush (DOD), Edward J. H. Young, III, Dr. J. G. Kromer (MIT), Chairman NACA,

Dr. Alexander Wetmore (Smithsonian), Dr. F. W. Riddell (Boeing), Dr. Edward W. Condon (Bureau of Standards), John E. Allen (Air Force), William L. Edwards (Aeronautics), Dr. George W. Lewis (unpublished), Buckner J. F. Vickers (NACA), Arthur J. Rasmussen, Dr. Hugh L. Dryden, Director of Research, Standard Research (NASA), Edward J. H. Young (Langley), and Edward R. Sharp (Cleveland) (USAF photo).



### Boeing Union Election

The National Labor Relations Board will conduct a union shop election at the Boeing Airplane Co. plant in Seattle, Wash., Mar. 22 to 26 at the request of District Lodge No. 751, International Mechanical Union. A majority of the more than 11,000 company employees, eligible to belong to the union must vote for a union shop before the union can request such a shop of the company. The union has been recognized as the sole representative bargaining agent since well before the war.

## AVIATION CALENDAR

- [illegible]

## INDUSTRY OBSERVER

McDonnell Douglas Corp. has delivered its 40th F104 Phantom jet fighter with the last of 60 scheduled for completion within the next few weeks. The second F201-1 Banshee is now at Naval Air Station Patuxent for additional flight tests.

◆ **New Wright Cygnes: B-1150-2017** "We are being delivered to the Navy by Douglas Aircraft's 18-shipper installation, has a dry-talent wing of 1790 lb with a water rejection index of well over 3000 lb. The new model of the 18-shipper (18-shipper), which powered for B-29 during the war, has an output approach that of the great 28-shipper Wasp Major engine. The "Wasp" 18-shipper engine is the world's largest engine with a decade of continuous development since its initial installation in the Douglas XB-19 with a 2000 lb

At Finet and Curtiss-Wright Corp. have written "Rau" to the XC-113 project, an experimental Curtiss General Motors turbine in which a General Electric HT-900 turboprop engine was to have been installed. Abandonment of the HT-900 after two test runs also slowed down the project and the airplane has now been transferred to Lockheed Air Force Base.

\*Exponential cooperation between Northrup Aircraft, Inc., and Armstrong-Whitworth, British aircraft manufacturers, over possible licensing rights on the Northrup Liberator gas turbine have been discontinued without any definite agreement. The Liberator II has been under test for some time.

\*Which requirements for contact air carrier flying passengers will be tightened under CAB proposals now being circulated to the industry for comment. The Board said a study of the safety of contact carriers, including fatal accidents, nearly serious differences in some of the operators as compared with standards affecting both non-scheduled carriers and the combined airlines. Comments on the suggested amendments to Part 43 of the Civil Air Regulations are due in April 15.

► Howard Hughes contemplates indefinite control of the testing of the Hughes flying boat. This is indicated by his plan to spend \$120,000 on a new movable steel-bone shelter for the big craft at its Long Beach, Calif., harbor dock. Present construction and steel frame sections shuffling tail and outer wing panels will remain. But inboard frame sections will be replaced by a girdered steel structure mounted on air tracks permitting shifter segments to be moved close of structure, as fast as opened in and out of dock.

• **Wipespan of Airtel Maintenance Corp's "pooled maintenance" campaign** is selected by company's latest contract awards from Reagan C. Steiner, president. Airtel has acquired \$100,000,000 of new overhead business in four contracts signed with Pan American, TWA, Pacific Northern Airlines, and West Coast Airlines. Work covers eight aircraft and major fleet for preventive modifications to supercritical. Pan American Airtel placed a contract with American Over Sea Airlines for major overhaul work on DC-6s.

► *Observers predict that Russian domination of Carchedonoscandia will in no way affect the satellite country's membership in NATO. They say Russia using Carch participation in the organization is a ruse whereby the Russians can learn of international air transport developments from other countries without divulging information about themselves. Meanwhile, Pan American will continue its scheduled trips to Prope, and Carchedonoscandia Airlines, Carch national airline, plans to inaugurate flights New York to Prope.*

► **Comer's Air Force contract for 104 B-36 bombers** has been cut back to 95 due to a shortage of government furnished equipment. B-36s are scheduled to begin arriving at the Tinker Field (Oklahoma City) modification center Apr. 1. Air D-36 modification work will be done at Tinker Field before assignment of the very heavy bombers to tactical units of the Eighth Air Force.

► **Air Force orders for 21 Northrup F-5 fighter jets** totaling \$55,000,000 and for 15 auxiliary transport vehicles and 10 Arctic rescue planes equipped with auxiliary de-icing gear.

- Fourteen based on the original 100 hp. Mercedes engine is a 145 hp. Gipsy Major features the new Chrysler Super Air flylighting. The plane has a 128 mph top speed and 115 mph, with a range of 400 miles.
- Three British Bristol lightnings have been sold to the French for operation in Indo-China by the Société Indochinoise de Transports Aériés.

## ENGINEERING & PRODUCTION

## AIA Sets Uniform Specifications On Nonflammable Hydraulic Fluid

Meeting of Aircraft Research and Testing Committee also discloses progress that has been made in solving other critical industry problems.

AN uniform specification for non-ferrous hydraulic fluid has been set up by the Aircraft Research and Testing Committee (West Coast) of Aircraft Industries Association and soon will be submitted to CAA and Society of Automotive Engineers for final comment. The specification will require the fluid to maintain its viscosity during a 100% increase in volume produced by a 50% increase in pressure.

◆ **Aluminum Street Shoes**—Concern was expressed that the use of aluminum in shoes could lead to health problems. The U.S. Food and Drug Administration (FDA) has issued a warning that shoes containing aluminum particles could be harmful if they are worn for long periods of time. The FDA has also issued a warning that shoes containing aluminum particles could be harmful if they are worn for long periods of time. To date, only one such compound, "aluminum oxide," manufactured by Products Research Co. of Los Angeles, has appeared on the market as a solid in-

posed over the last of century, production in the country of large tapered steel shafts vital to fabrication of stressed wing skins for new high-speed aircraft. To date all thickening stress skin stock, but had to be hand produced in plants requiring it, and inevitably was more than manufacturer of aircraft.

a variety of safety funds last year, as reported to S&P. At the National Agricultural Conference in Los Angeles last fall, considerable concern caused by two specifications connected with the earnings of individual district cowboys, and by their manufacturers.

► **Forward Overtime Specs**—The program shows a strong effort to gain a uniform set of specifications, adaptable to all segments of the industry.

While it would seem that the research group's work might lead to production of a single universal filter, field tests currently will set the pace. A quantitative study of industrial and commercial users, and oil and chemical companies, indicates that as many as three grades might be indicated due to differences in hydraulic systems of various types of aircraft.

### AMC Puts Dorrell In Charge of Sales

Airbus Maintenance Corp., Van Nuys, Calif., has appointed Vernon A. Deitch to the newly created position of general sales manager. He joined the company in 1947 as manager of the maintenance and sales of Airbus aircraft.

Active in aviation since 1924, Dorel was former vice president in charge of operations for Mexicana, Aerol and was at one time division operations manager of the Pan American Airways affiliate operating from Mexico City.



PAC'S ENLARGED BURBANK BASE

With the acquisition of four major buildings and more than 400,000 sq ft of the above space, Pacific Airservice Corp. claims the West Coast's largest service facilities for commercial, executive and private aircraft. Service lines radiating to major airlines is available. The new layout is directly across the street from PAC's recently built \$2,000,000 overhaul base.

Los Angeles and 32 Pass. 310 has also served as sales and development executive for Lockheed and Votco Aircraft.

Dorrell recently headed his own firm of aviation consultants to companies in the United States and Central and South America.

In other personnel actions:

• **Wright Aeronautical Corp.** elected Stanley P. DeLoe executive. He succeeds C. C. Sells who retired. DeLoe was working in the firm of his brother, Will Sells, in that post.

• **Am. Rutherford, Inc.** named Walter C. Latham vice president and general manager. Latham was formerly general sales manager for Elliott & Fager, Manufacturing Co., subsidiary of Standard Oil Co. of N.J.

• **General Electric Aviation Division** appointed Charles H. Kiefer manager. Kiefer, who has been assistant to the manager, joined the company in 1952.

• **Aircraft Associates, Longview, Wash.** has added Arthur Robinson to its engineering staff. Robinson, who was formerly with Lockheed Aviation Corp., was more recently in the engineering division, with which Charles H. Kiefer, formerly with Thompson.

• **Boeing Instrument Co.** named G. W. Wilson industrial director for the entire area, with headquarters in New York. Wilson, who was formerly with Boeing Co. as secretary and counsel, is the son of John Charles G. Wilson, who retired Dec. 1.

• **Boeing Aircraft Corp.** Pacific Division has named Ben Wilson executive officer for Pacific operations. Previously Wilson was chief engineer of the company's Pacific Division.

• **Glenn E. Murrie Co.** appointed W. P. VanDyke director of sales. VanDyke was formerly with the company as sales manager and general manager.

• **Boeing Aircraft Corp.** has named John H. Smith as chief engineer for the entire area, with headquarters in Seattle. Smith was formerly with the company as chief engineer for the entire area, with headquarters in Seattle.

• **Boeing Aircraft Corp.** has named John H. Smith as chief engineer for the entire area, with headquarters in Seattle. Smith was formerly with the company as chief engineer for the entire area, with headquarters in Seattle.

• **Boeing Aircraft Corp.** has named John H. Smith as chief engineer for the entire area, with headquarters in Seattle. Smith was formerly with the company as chief engineer for the entire area, with headquarters in Seattle.

• **Boeing Aircraft Corp.** has named John H. Smith as chief engineer for the entire area, with headquarters in Seattle. Smith was formerly with the company as chief engineer for the entire area, with headquarters in Seattle.

• **Boeing Aircraft Corp.** has named John H. Smith as chief engineer for the entire area, with headquarters in Seattle. Smith was formerly with the company as chief engineer for the entire area, with headquarters in Seattle.

• **Boeing Aircraft Corp.** has named John H. Smith as chief engineer for the entire area, with headquarters in Seattle. Smith was formerly with the company as chief engineer for the entire area, with headquarters in Seattle.

• **Boeing Aircraft Corp.** has named John H. Smith as chief engineer for the entire area, with headquarters in Seattle. Smith was formerly with the company as chief engineer for the entire area, with headquarters in Seattle.

## BRIEFING PRODUCTION NEWS

• **Boeing Aircraft Corp.** helicopter production is now at the rate of three a week. If an expected government order is received, output will be stepped up further. The company has produced 250 probe probes (insecticide sprayers) in the last five months and production rate is now 20 per day. Employment is now up to 2100, an increase of about 100 in the last six weeks. Latest major B-50 helicopter 50th (include six more) 47 D to the Argentine Navy and two to the Directorate General of Agriculture of Iraq.

• **Hamilton Standard division, United Aircraft Corp.** is now in production on a 16 ft. 6 in. hollow-stem propeller, the largest one produced at the East Hartford plant. It is the first variable-pitch hydrogen design (steel stem blades) and is intended for the Boeing Stearman. The first 16 of the 55 Stearman's now in production will use the propeller.

• **Altkor Aircraft Manufacturing Co.** has received additional contracts for heat transfer equipment for Boeing B-50 bombers. The equipment includes engine oil cooling system and super-heater intercoolers for the 32 additional B-50 bombers recently ordered. Altkor also is supplying a large quantity of electrical power equipment and complete cabin pressure instrumentation for the B-50.

• **Northrup Aircraft, Inc.** has received a correspondence from Secretary of Labor Lewis B. Schwellbush for its accident prevention program, rated one of the best among West Coast industrial plants.

• **Kaiser Company, Inc.** has inaugurated a retirement benefit plan applicable to all long-term employees who reach age 65 and have been with the company 15 years. The plan permits a retired employee to make as high as \$500 annually from a combination of Social Security and company benefits.

• **Testis Engineering and Manufacturing Co.** has received a second order for engine test cells from the Avionics Company of Colombia. The new order calls for the construction of four Douglas C-47 test cells into engine test cells. The original order was for the construction of seven C-47 test cells. The new order also included several modifications. North American B-25 bombers in the government of Venezuela.

• **Rigid-Tex Corp., Buffalo, N. Y.** is supplying sheet and strip metal to which die-casting patterns have been added by a patented die-casting process for use in Cessna B-16 and other light planes. The resulting process was developed by Richard E. Starnes, chief company engineer. A 30 percent plant expansion is planned to handle the increased volume already on the books.

• **Goodrich Aircraft Corp.** has started production of aluminum line for ice tube storage for the Yeh Corp., Yeh, Pa. The line will be used as platform supports and storage containers for the York Automatic Ice Makers for hotels and restaurants. The line is being fabricated in the large shop at Alton, Ohio and will require about one year for completion.

• **Boeing Aircraft Corp.** has moved up its B-50 production to last a day but has decreased the model 100 engine transport output to one a week. Present employment is between 2,500 and 2,600, unchanged since a month ago.

### Convair Election Results

Close to a year of union jurisdictional disputes has ended at Convair. The International Union of Mechanical Workers has won the election to represent the workers at the company's plant in San Diego.

Results of a National Labor Relations Board election show 347 ballots for IAM and 344 for UAW, with the CIO union producing the results on numerous counts.

Should IAM, the company's union of contract, be re-elected, an immediate negotiation of a new contract, with the union's (industrial) working wage advances for its members, will be the next thing on the books.

Throughout the jurisdictional controversy Convair has been operating under terms of an IAM contract which expired in May 1947. Since then, pending the election just held, the company has operated under terms of the old contract.

question for airline executives...

# Why Buy Expensive Tooling?

**Ownership of tooling involves investment and overhead**

**Is expensive tooling for maintenance a wise investment, when full-time use of the equipment is doubtful?**

**Isn't it more logical to use Pacific Airmotive's well-equipped plants, and save both the initial cost of the tooling and the overhead of often-idle equipment?**

If you buy the special-purpose tooling required for modern aircraft maintenance and overhaul, you fall heir to several inherent disadvantages: (1) a portion of your capital is tied up in unutilized assets, (2) your fixed overhead rises, and (3) a secondary overhead—maintenance operation often develops, i.e., if you own equipment designed for high volume, conditions can frequently force you to use it uneconomically for short periods.

Consider the above disadvantages with the simplicity and economy of contracting your maintenance and overhaul to Pacific Airmotive: (1) your capital investment in tooling—as well as in shops and inventory—can be far less; (2) your fixed overhead is lower, permitting you to give maintenance expense more closely to maintenance requirements; and (3) all of your work is done at PAC's economical high-volume rate.

**Save capital and overhead by using PAC facilities**

**You will find the quality of PAC service consistently high. You will also find that your work receives prompt attention, accurate repair, and a high quality of service, even during peak or emergency conditions.**

\*\*\*\*\* **PAC SERVES MORE THAN 60 OF THE WORLD'S AIRLINES** \*\*\*\*\*

**SUPPLIES** • PAC distributes more than 300 aviation lines through nine bases in the U.S. and Alaska. This includes engine, accessory, prop, and instrument parts and assemblies.

**SERVICE** • PAC furnishes engine, engine-accessory, propeller, instrument, and engine maintenance or contract overhaul at two major bases in the U.S. and Alaska.

Current year record major service bases for additional information:

ANCHORAGE, ALASKA • BURBANK, CALIFORNIA • KANSAS CITY, KANSAS  
 LITTLE ROCK, ARKANSAS • OAKLAND, CALIFORNIA  
 LOS ANGELES, CALIFORNIA  
 PACIFIC AIRMOTIVE • PACIFIC AIRMOTIVE

2640 North Hollywood Way • Burbank, California

# Willard

SAFETY-FILL, MANIFOLD-VENT

## AIRCRAFT BATTERIES



### IMPORTANT NEW FEATURES

Willard design absorbs heat for reduced battery loss in operation and provides maximum battery interchangeability. High capacity in weight ratio. Built-in cell during performance. Rugged Willard Quality design. Safe and secured by a maximum weight. Can be disassembled and disassembled for quick start-up for long life.

**WILLARD STORAGE BATTERY COMPANY**

Cleveland • Los Angeles • Dallas • Memphis • Portland • Toronto



Operator uses Reflectoscope's scanning unit along rib section of propeller material, and marks location of flaws on adjacent plan surface.

## Supersonic Pulses Probe Metals To Hunt Flaws, Check Thickness

Internal defects in high-strength propeller steel quickly detected via high-frequency sound waves. Material also accurately gauged.

By H. C. DRAKE, Director of Research, and E. W. MOORE, Technical Data Staff, Sperry Products, Inc.

Results obtained in production testing at Curtiss-Wright's Propeller Division among instruments governing ultrasonic waves indicate that this technique has a wide potential in the general field of various materials in inspection.

Three instruments—the Reflectoscope and Reflectoscope—already and in quick control by Curtiss-Wright's research, design and suppliers have been found applicable for testing steel extruded aluminum and magnesium stock, aircraft spars, turbine wheels and propeller blades, die stock, and many assorted forgings and castings.

With every advance in speed and weight requirements of aircraft, there is a corresponding advance in the quality of steel, aluminum alloy, and all other materials used in plane construction. Each stage of development brings a surge of former standards, quality control techniques, and superlatives which were previously tolerated because respect and grounds for accepting as

new rolled steel plate, or aluminum extrusion.

The Reflectoscope and Reflectoscope—engineered and manufactured by Sperry Products, Inc.—are both used for routine testing and measuring at C-W's Propeller Division. The Reflectoscope is employed in one particular application to detect, for discontinuities in rolled steel stock (modified SAE 4320) and the Reflectoscope is used to check the wall thickness of all finished propeller blades.

▶ Theory of "Scopes" The Reflectoscope

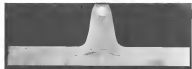
scope's operating beam can be directed into solid materials in the same manner that high-frequency radar waves can be used for ranging and detecting objects in the air. Usually directional, high-frequency vibrations of the order of 5 to 50 mc. when projected into a solid will be reflected back by cracks, voids, inclusions, and opposite surfaces. First shells and aluminum alloys permit excellent ultrasonic penetration.

The instrument generates pulses of high-frequency electrical oscillation which are converted into pulses of supersonic energy by a crystal in the scanning unit which is placed on the work. The generated beam is reflected back to the crystal by discontinuities in the material (or by opposite surface). An adjustable time-measuring system (rectangular wave pattern) is integrated with the circuitry to spot the oscillations to show microseconds of distance within an inch or feet, depending on how the instrument is adjusted. All defects flow in steel and aluminum at depths as much as 24 to 25 ft.

The time for the sound to travel and return as a supersonic "echo" from a defect or opposite surface is indicated by a deflection of the trace on the oscilloscope screen at a point not corresponding to the particular time interval. Using the rectangular wave pattern as a scale, the operator finds the reading.

▶ Metal Factors—A check one of the Reflectoscope in C-W's Propeller Division is to test the rib section of rolled steel plate, replaced in the fabrication of the world's largest steel propeller blades—used on the six-pusher 8400-hp engines of Consolidated Vertec's B-36. Propellers in this class are expected to withstand extremely high normal and vibrational stresses, surface pressure and temperature changes.

The 1129 blade (Curtis designation) on a B-36 carries a centrifugal load of 250,000 lb. and will withstand a tip speed of over 1327 ft.-sec. to the speed of sound. The check described in the three blade propeller after spinning at 10 feet in diameter.



Section of rolled steel plate containing critical flaws detectable by Reflectoscope. Instrument would disclose that flaws are located too deep for removal by machining, thus permitting internal rejection in early production steps.

Defect...



No Defect



Exact location of flaw in rib is indicated in photo record (left) of Reflectoscope unit. Here, flaw is 2 1/2 in. from rib top. Right photo shows indication obtained in rib area free from flaw.

Because the strength-to-weight ratio of material is of paramount concern to propeller makers, Curtiss also alloy steel which can be formed into a thin-walled, lightweight, hollow structure of considerable strength. Vite properties of this steel must be studied constantly, and the plates from which blade sections are fabricated are milled and tested according to rigid specifications to guarantee occurrence of objectionable flaws. Both manufacturer and mill work together closely to improve this steel.

Hard as the glass-filled steel plates were being reported in huge quantities and defective plates were discovered only after great cost in labor and tooling operations had been incurred. For some time the actual portion of the stockpile of rolled steel plates was an uncertain quantity. This is to be, no longer a reflection on the mill. Material rejected as the propeller plant would be considered by most standards has good steel.

A hollow steel propeller blade is

made in two sections, each of which starts into production as a flat steel plate. The main stages, stripped of dozens of intermediate steps consist of rolling, forming, welding, heating, pressing, die straightening, heat treatment, balancing, planing and assembly.

What might actually be considered a major actual flaw in a blade piece of rolled steel plate may constitute a very serious stress raiser after the material is subjected to roughly 90% of its original size. Prior to the use of the Reflectoscope, each of these plates had to go through 75 operations before item could be performed to insure that the plate was satisfactory. Blade material supplier having him eliminated this type of inspection.

► **Scope Application**—The testing procedure is rapid and accurate. The rib surface is prepared on the grinding surface and the Reflectoscope calibration is checked on the test set-up. With the aid of a hand the 10-ft plate is moved onto a flat table where the operator tests the

center rib in a matter of minutes. The first side the rib surface to insure good crystal-to-surface contact, and moves the measuring unit along the entire length while watching the reflectoscope screen for indications of defects.

Whenever an indication appears, the depth of the flaw is noted in chalk on the plate at the base of the rib. A special scale is provided to help the operator determine if a discontinuity is located where the final portion area of the plate is in a portion which is ultimately milled away.

Correct records are kept on all tested plates—both rejected and accepted. The history of each tested plate is traced back to the input from which it was rolled. Supervisory testing thus makes constant control of rough material possible and enables the quality control department to help the mill establish a controlling procedure which maintains the amount of flaking concentrated in rolled steel plate.

Indeed, only a negligibly small percentage of plates was good enough to proceed. Accordingly, the Reflectoscope then was taken into the mill where it assisted greatly in determining the effectiveness of different processes that were used. The mill continued to roll the steel and to improve methods of cooling in each new plate run. Reflectoscope-treated and further data provided.

By noting the sizes of indications from each lot of freshly rolled plates, cooling procedure could be directed to a more satisfactory work at the mill. Through factory mill cooperation, the steel plate was referred to a point where a rejected plate is now the exception instead of the rule.

If the plate stands up under super-sonic screening at its ready for sailing and other operations. Tests are then made for surface defects. Finally, the blade sections are parted and welded together along the rib section and around the edge. The two sections, now joined as one, constitute a blade which, however, is still in a crude state. Boring and various heat treatments such as tempering, hardening, and tempering follow.

After the blade is shaped and polished, it undergoes a super-sonic test for wall thickness using the Reflectoscope. With this instrument, tests can be made in areas formerly inaccessible, and the blade is assured of performance within the stress limits in established. The slightest irregularity in a propeller subjects an airplane to excessive vibration when in flight.

► **Case Study**—The Reflectoscope gives critics super-sonic change and projects it into the material under test. Whereas the Reflectoscope reading is actually a measurement of the time elapsing between an initial acoustic pulse and the return of its "echo," the Reflecto-



Reflectoscope of thickness indication as it appears on screen. Flaw is identified in view on calibrated scale corresponding with actual thickness (nominal thickness) of blade.

scope reading is derived from the frequency at which the material resonates.

If the part under test has resonant frequencies within the tuning range of the instrument, these are of little importance; momentary increases of energy to the cathode ray, through the watch, may result. Each energy increase is indicated by a sharp deflection of the cathode ray trace. A direct reading scale over the reflectoscope screen tells the operator the thickness of the piece under test rather than the actual frequency. The instrument measures thickness of material ranging from 0.015 to 100 in. directly, and up to several inches indirectly.

The device is portable, weighs only 40 lb and can be moved to any corner of the plant to check blades rapidly and without interruption in production line procedure. The operator divides the polished blade into stations with chalk marks on the surface. He then measures the exact thickness of the blade wall at each station with the Reflectoscope. The plus or minus difference between the specified thickness and actual thickness is noted on the surface station where the test was made. These markings serve as reliable guides in final polishing, for they indicate where the surface can be exacted to be good.

## Veteran Employment

The trend of our veteran employment is the newest and aircraft parts industry is upward.

Veterans now comprise 11 percent of the payroll, compared with 25 percent a year ago, according to the U. S. Employment Service.

USCS finds, also, that veterans are given preference in hiring, but that little use is made of the veteran on-the-job training program.

## BENDIX-SCINTILLA

the finest ELECTRICAL CONNECTORS money can build or buy!



## AND THE SECRET IS SCINFLEX!

Bendix-Scintilla® Electrical Connectors are precision-built to render peak efficiency day in and day out under difficult operating conditions. The use of "Scinflex" dielectric material, a new Bendix-Scintilla development of outstanding stability, makes them vibration-proof, moisture-proof, pressure-proof, and corrosion-resistant. And, because they are made in temperature extremes, from -57° F. to +300° F., performance is remarkable. Thickness strength is more than 100 volts per mil.

The common, made of the finest materials, carry maximum currents with the lowest voltage drop known in the industry. Bendix-Scintilla Connectors have fewer parts than any other connector on the market—no exclusive feature that means lower maintenance cost and better performance.

Write our Sales Department for detailed information.

► **Maximum Power, Pressure-Proof** ► **Radio Shield** ► **Single-piece Insert** ► **Vibration-resistant** ► **Light Weight** ► **High Area Resistance** ► **Easy Assembly and Disassembly** ► **Low parts cost** ► **Low maintenance**

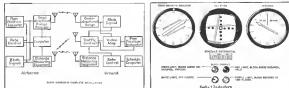
Available in all Standard & M. Contact Configurations



Wall thickness readings at each blade station, as indicated by Reflectoscope, are marked on surface to constitute a guide in the final polishing operation.

## TRY THIS TEST YOURSELF...

440700 STATE  
440700 STATE



There are also certain basic personal measurements for both interview and focus

## FOUR TIME AND MONEY- WHIZ AVIATION CHEMICALS

They step up efficiency; cut down man-hours!

### WHIZ Ten-Ten

Don't waste time cleaning grease! Wash it away the Whiz way with Ten-Ten Concentrate. For engine parts, landing gear, wheel wells, tools, pumps . . . loosenes heavier films and grime, too. Simply dilute as directed, apply by brush or spray, brush away with water.



### WHIZ Immersit

Throw away your scrapers and wire brushes! Clean metal parts the modern way—just immerse them. Cleans off carbon, grease, sludge, varnish. Strips off paint, enamel, and chrome. When you have a carburetor, fuel pump, piston, or cylinder to clean—Immersit!

### WHIZ Klad Polish

You really save man-hours cleaning and polishing aluminum surfaces with Klad Polish! It does the job in one operation—removes dirt, grime, and oxidizers; gives that high polish that makes aluminum gleam. It's easy to apply; easy to remove. It's non-corrosive, non-inflammable, non-toxic.



### WHIZ

#### Fast Acting Paint Stripper

Here's the easy way to remove paint from all metal surfaces. Skip the sanding and scraping. Strip it off with Whiz! It's water-soluble . . . leaves the surface ready for re-painting or polishing. Non-inflammable. Won't corrode aluminum.

Easy rinses in the complete Whiz line of aviation chemicals is specially engineered to meet aviation needs. Let us show you how Whiz products will save man-hours for you. Distributors in every territory are prepared to give prompt service.



PRODUCTS OF

**Hollingshead**

LEADS IN MAINTENANCE CHEMICALS

B. M. HOLLINGSHEAD CORPORATION  
CAMDEN, N. J. TORONTO, CAN.

systems. These include:

► **Single-Site Operation**—The system must be capable of setup as a single site and provide navigation and traffic control to the limits of line of sight range. This requirement is principally refinery, striding down the aisle to open the system from a center, a small island base or a beachhead. It necessitates using a system based on police controllers and rules out hypersonic systems of navigation, such as Loon, Cuck, Troca, etc., since they require multiple sites. It also eliminates all landing systems that require equipment placed far outside airport limits.

► **Flow Control**—A method of flow control is necessary to provide scheduled arrivals in crowded terminal areas and complicated traffic patterns.

Equipment specified for development and installation during the five-year interim program includes:

#### Navigation Equipment

► **Omni-Directional Range (VOR)**—Capabilities of the CAS program of switching these facilities is more standard. However, it is pointed out that their accuracy should be improved and that eventually it will be necessary to replace the omni-range with more accurate equipment. Transition from low frequency, four course, aerial ranges to omni-ranges will be difficult without utilizing some range program already utilized. CAS already has sufficient funds to complete the omni-range program.

► **Equipment**—Intelligence—Development of equipment is a necessary activity factor. All airborne equipment must be maintained by ground support and vice versa. It is essential that pilot know the information available on the ground and ground traffic controllers have the same information available to pilot from non-published sources. Ground traffic control systems must be introduced so that areas in one system can be detected and corrected by another without disturbing the traffic flow.

► **Area Identification**—This is required both for military identification of friendly planes and civil need to maximize control restrictions are covered and equipped with by the proper plan.

► **Functional Equipment**—The system must get all traffic control information from ground equipment and all receive from information to be used in a safety program to simplify the system and power equipment center from conducting net space and time separation.

► **Cloud-Circuit**—Principle—Operation on the cloud-circuit principle means that the system continuously reports that it is operating continuously.

► **VHF Navigation**—Communication—Receiver—initial delivery of advice as

current of this type are expected soon. Military models are still in the service test stage with applications for a production model scheduled for completion by next October. The initial delivery of this program is the lack of a lightweight aircraft suitable for private plans. All CAS accommodate a tendency to reduce radar installations to attempt reduction in the equipment density within programs of a probable asset.

► **DMB**—Distance measuring equipment is essential to one of the core range and instrument landing systems. DMB systems have been successfully demonstrated. Transmittal problems as to determine specification for production models. Next October should be final deadline for the specifications. Lack of distance information is a great handicap and is one of the most serious weaknesses. Additional information should be given to develop a light weight DMB, and offset course computer for light private aircraft.

► **Course Computer**—Development of an offset course computer necessary for use of multiple arrivals and automatic flight operations in the omni-range system is an advanced step of development. A TCA can make a calculation of an inverse model at the earliest date to full advantage of the omni-range facilities can be obtained.

► **Radio**—Use of ground radio because and airborne range used is not recommended as a primary requirement. It is a secondary aid will be pushed by the military with only small reliance on anticipated. CAS plans to model Radio beams on most of its omni-range sites.

#### Landing System

The complete instrument landing system during the interim program consists of five elements: VHF primary localizer, VHF glide path, precision localizer (GCA), three 75-megacycle markers along the localizer course, and two low frequency approach locator stations. The system is divided at the middle and outer markers.

#### Traffic Control System

► **Search Radar**—Basic element in the traffic control system is a search radar with 40-mile radius to provide range and heading information on all aircraft in the approach area with an accuracy of plus or minus one mile in azimuth and plus or minus one-half mile in range. Longer range search radar (125-mile radius) is now being operated periodically at New York and Washington. The air force and navy have earlier but developed a radar traffic control system (ICPN-16) that is now being used for all traffic control functions at Andrews Field, Md. and

Wilmington, Ohio. These search radars should be equipped with a moving target indicator that eliminates ground clutter from stationary targets and further tracking that reduces the adverse effects of terrain slope problems. Radar systems should be equipped for daylight operations in airport towers and traffic control centers. Vario map features include weather, terrain, range, courses, runway, etc. should be included in scope parameters.

► **Autobase Transponder**—Autobase radar beams are available now for variable aircraft identification but more information is needed. Equipment that will also provide wind altitude information automatically when interrogated by secondary ground radar. This will be necessary in achieving high speed air traffic control.

► **VHF/ADF**—Autobase VHF direction finding equipment should be provided on search radar ranges used for traffic control. When aircraft transmit on a given VHF channel a track of light on the radar screen is the beginning of the transceiving plane, giving positive identification.

#### Communication

► **VHF/ADF**—Ground facilities are now completely equipped with state-of-the-art VHF radio equipment. Full benefit from the program is not being received because of the lack of airborne equipment.

► **Long Distance Interphone Circuit**—Equipment of the private has long distance telephone circuits linking many traffic control centers as essential to accelerated flow of aircraft traffic.

► **Private Line Air-Ground**—To use the present system requiring of many aircraft facilities on an ground channel, a system for private visual only of aircraft should be developed. This system would handle all routine communications such as holding instructions, landing clearance, low instructions, etc. This system is essential in the target system and should be developed as soon as possible under the interim program.

With the possible exception of the airborne VHF direction finding equipment it may be possible to utilize all of the components of the interim system or approved revisions thereof in the first interim system. TCA emphasizes, however, that considerable simplification of equipment should result as the target progresses. The real goal is a carefully planned system that accomplishes maximum results with a minimum of equipment other than as secondary functions.

(This second article, to appear in a subsequent issue, will discuss equipment requirements of the target system.)

## Landing Gear Designed To Give Softer Let-Down

A new landing gear—now applied as standard equipment for the Lomacore biplane Silver—provides four points of shock absorption to afford softer let-downs.

Designated "Silver," the gear comprises a flexible tubular steel leg with a combination coil spring also unit under the "floating axle" principle of the automotive industry.

This efficient assembly of a spring-type gear with the light weight and shock absorption of an also gear. A given spring, if it is damped, does not absorb a shock, but merely changes the direction of the energy, and must rely on a side-friction of the spring to the ground for whatever softening action is obtained. In the Silver design, softening action is provided by the coil, giving increased shock absorption and reduced tire wear.

The new steel has been developed from the former gear on the Silver and is considered more rugged. There are over 17 percent fewer parts, and the total is four inches wider, weight



measuring approximately the same. Essential differences between the new and old design include (1) Replacement of the old steel axle with a tubular steel axle and (2) the use of a full cantilever bush-horned chrome molybdenum alloy tubular steel leg tapering from 2 1/2 in. at the top to 1 1/2 in. at the bottom, and (3) redesigned tire cut features, a system being going better control at 50 mph and improved, more uniform shock absorption. Chevsco type jacking has been changed to the Inter-Orging type.

Other design changes made to simplify production include substitution of a steel forging for a built-up welded structure, and a switch to tubing with a close-tolerance inside diameter for fabrication of the cylinder. Before final adoption, the landing gear was subjected to extensive testing on two aircraft, encountering stresses not normally encountered in everyday flying. It is stated that ground tests revealed marked resistance to ground looping, and that the gear maintained ground-looped at high speeds on both rail and concrete, the gear maintained the airplane on level keel.

## NACA Cites Many Attainments In Year of Intensive Research

Significant advances are made in aerodynamics, propulsion and structures. Report notes headway against operating problems. Theory gets new boost.

Experimental progress in steady motion, propulsion and airframe construction has been disclosed by the National Advisory Committee for Aeronautics in its 23rd Annual Report, covering results of research in fiscal 1947. Goals were also made in the opening problem front, and especially aimed for on increased emphasis on theoretical work.

With almost the whole of modern aerodynamic theory at its disposal, the NACA is conducting an intensive program in supersonic aerodynamic theory—first, to solve these problems in the absence of any further foreign contributions, second, to make the U.S. the leader in the important field that Europe was in the previous field.

### Aerodynamics

► **Airfoil**—Studies of the effects of surface conditions on high-speed air flow revealed that there are at least as large as the effects of airfoil shape. Skin joints, dent holes, or surface irregularities occurring in regions of surface laminar flow can produce as low drag coefficients twice as great as those for smooth laminar flow. An important result of the year was development of the NACA G-Aero airfoil, which eliminated the trailing edge cup of the 5 series foil without affecting its laminar aerodynamic characteristics.

► **High-Lift Design**—A continuing program was the effect of Reynolds number (scale effect) on the maximum lift coefficient of various flap configurations. Generally, low Reynolds numbers increase the maximum coefficient of pressure flap configurations, but as increase in Reynolds number (drag reducing area/total of plane) decreases these values.

► **Wing Characteristics**—Effect of Reynolds number on wing wings showed substantially the same phenomena—i.e., sweep at low Reynolds number increases the maximum lift coefficient over that of the unswept wing, while at high Reynolds number the reverse is true. A significant result was obtained in an investigation of split and double-slotted flaps on this wing. One configuration tested disclosed an increase of 115 percent in

maximum lift coefficient with tail-joint flaps deflected.

► **Boundary Layer**—The year attracted increased attention to the possibilities of boundary layer control for increasing lift and reducing drag. One notable result was an actual zero leading edge stall double-slotted flap, and boundary layer action at 9-45 chord produced a maximum lift coefficient of 3.6, a phenomenal value. It was shown that maximum lift on thick airfoils is greatly affected by the location of the stall on the airfoil, whereas the stall must be located along the forward portion of the airfoil due to separation in this area. The maximum lift angle is approximately 10 degrees. Laminar flow measurements on the Bell XS-1 up to Mach 0.8 show good agreement with wind tunnel prediction, an appreciable improvement of the center-of-pressure, and a maximum lift coefficient boundary layer in the same general shape as that determined on the North American F-10 Mustang. Load data at higher Mach numbers has not been reported. Aerodynamic theoretical methods for computing the loads on sweptback wings are now available, and continue the critical work on the subject of air loadings and pressure distribution was accomplished. In addition, flight in supersonic flow has carried out the F-10 and the Lockheed YF-102 Shooting Star jet fighter, showing good agreement with theory.

► **Load**—Loading received considerable attention, with studies extended from conventional to the airplane in a rigid body to its consideration as an elastic body, with effects of structural elasticity in gain included in theoretical calculations. Air loads on tails showed numerous phenomena not heretofore observed, emphasizing the importance of tail interference, the difference in phase between fin and rudder, vertical tail loads on rolling pull-outs, and the increase in moment load caused by banking.

► **High-Speed**—Wind tunnel studies, at high speed, of this, sharp leading edge airfoil disclosed that reduction of drag by type is greater than with blunt leading rounded leading edges. Tests with double-wedge airfoils sub-

sonic that under most conditions swept-back outside the Mach cone actually increased the lift-drag ratio. Although it has been known that double-wedge foils have the lowest drag at supersonic speed, if shock friction be neglected, this friction term of boundary airfoils revealed increased laminar flow and therefore lower viscous drag and lower total drag at certain combinations of Reynolds number and Mach number.

Work on the effect of agent into an expansion wave drag showed that in crossing agent into products decreased drag, provided the wing is well within the Mach cone. An external leading wave did, neglecting friction, supersonic to plane wings actually have greater lift drag ratios than subsonic wings. Also, an important result was obtained in the reduction of wing-body interference wave by the free-hill method. Here, a series was developed for shaping the surface of the body at the juncture with the wing so that interference is greatly reduced.

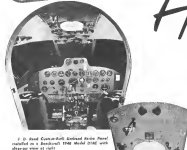
► **Boundary Layer Heating**—A method was worked out for determining the cooling requirements in the region of the boundary layer of a fighter or guided missile body. This was applied to a typical nose and intake ducting that the body length for a completely laminar boundary layer is about 70 ft at Mach 5.0 and at an altitude of about 100,000 ft. Another prime result was discovery that heat transfer through the boundary layer has a marked effect on its stability, causing mass disturbances. It was found that removal of heat from wing or fuselage increases stability of the boundary layer.

From this study it was discovered that at Mach numbers greater than 3.0 the heat drawn from the airfoil balances the heat radiated from the surface and the boundary layer flow is completely stable at all Reynolds numbers.

► **Longitudinal Stability**—A study of the downwash behind swept wings indicated that maximum rate of change of downwash with angle of attack occurs in the regions normally occupied by the horizontal tail, pointing toward a lowering of the tail location or a lengthening of the fuselage plus wing sweep. Tests indicate that a combination comprising leading edge flaps over the center portion and trailing edge flaps over the rear portion of a swept wing produces a reasonable compromise lift coefficient and longitudinally stable characteristics at the tail.

► **Flying Qualities**—Experiments with the Bell XS-1 up to Mach 0.8 showed that the stall level and stick force static longitudinal stability was slightly positive up to the maximum speed tested. The variation of elevator angle and elevator force with normal acceleration in takeoff and pull-up was satisfactorily stable.

# IT MAKES THE BEST. *Airplane* BETTER



A J.D. Reed Custom-Built United Radio Panel installed in a Beechcraft 1740 Model 2140 wing, showing view at right.

### A UNITIZED RADIO PANEL CUSTOM-BUILT FOR YOUR PLANE

With a J.D. Reed Custom-Built Unitized Radio Panel you are ready for all-weather flying with the added safety and convenience provided by such operational features as:

- VFO radio communication and navigation in addition to standard aircraft features.
- Unified radio system to house eight different transmitters for direct communication with them on the ground.
- Galley radio with clear receiver and five band quality for passenger entertainment.
- And latest electronic instrument landing circuit.

Call or request forms for full information on a J.D. Reed Custom-Built United Radio Panel designed for your present plane or any you expect to buy in the future.

- REPAIRS, SALES AND SERVICE
- SATELLITE AIRCRAFT REPAIR SERVICE
- AIRCRAFT PARTS
- COMMERCIAL AND INDUSTRIAL
- AIRCRAFT RADIO DISTRIBUTION
- AND SERVICE
- CHARTER SERVICE
- AIRCRAFT REPAIR SERVICE
- INSTRUMENT SERVICE — LARK TRAINER

**J.D. REED & CO., Inc.**  
Beechcraft  
DISTRIBUTOR

HOUSTON—Municipal Airport, Wy 9-1201 • DALLAS—Love Field, Dime 4-2710 • NEW ORLEANS—New Orleans Airport, CR 2770

and static directional stability was high at all speeds. All controls were effective up to the highest test speed. Tests with the Douglas D-558-1 plane are now being completed with results expected.

Results of a general investigation of semi-inclusion indicate that satisfactory control of large aircraft at subsonic speeds, and of smaller aircraft operating at supersonic speeds, may be obtained with a control surface which produces a control reaction velocity proportional to the error in position between the control surface and stick.

► **Springing.** The design requirements for spring design of aircraft are effective control of subsonic recovery from fully developed angles of light post-stall planes have been determined, with required relationships established between the tail design parameters, relative density, and relative mass distribution of the craft. Studies of elevator hinge moments in spans disclosed that elevator may have a strong up-bending tendency due to the high angle of attack of the span at the aft, resulting in increased peak hinge being required for all elevator deflections.

► **Air Inlets.** An empirical design method has been developed whereby satisfactory wing loading-edge air inlets may be determined. An analysis of air inlet studies at a fully submerged inlet with a cascade of airfoils inclined to the upstream to turn the entering air. Attention was also paid to the various characteristics of more inlet types, including the use of this investigation indicated study of two sharp-edge upstream inlet with control control bodies.

For supersonic speed, the importance of determining expansion shocks from burning ahead of the inlet was indicated. Studies were continued on the use of spike diffusers, which provide an initial compression of the supersonic stream thereby reducing starting length rates of the non-starting conical shock of diffuser.

► **Vibration.** Flurer-Rossbach showed that when the trim air of an aircraft is ahead of the quarter-chord line, the magnitude of vibration is greatly reduced, but when the trim air is behind that point dangerous amplitudes may occur. It was also found that a turbine fan blade will have its maximum flutter speed when the zero dynamic center of the panel coincides with the blade section center of gravity.

These tests indicate that the greatest danger of turbine blade flutter occurs at the Mach number at which the local velocity on the upper blade surface is at the onset of transonic flow. This is caused beyond the critical Mach number the flutter disappears.

► **Propellers.** Claims for the selection of an efficient propeller for light planes

cover the range of power from 50 to 300 hp, speeds from 50 to 200 mph, propeller dia. 6 to 6 ft 10 in, and blade number from 2 to 6 for a wide range of propeller efficiency.

► **Helicopters.** Light tests indicate that rotatable shrouding intensifies rotor efficiency prior to reaching the approaching limitation due to vibration and loss of aerodynamic efficiency. Comparison was made with calculation of the operating conditions corresponding to an angle of attack of the rotating blade tip at approximately 12 deg is useful in determining the conditions for optimum rotor efficiency and useful investigations indicate that large savings in light power result from use of smooth rotor blades and additional savings can be gained from operation at lower rotor speeds.

► **Swirls.** Research indicates that an external length-based vortex device, such as a wing, does not affect stability, reduce structural weight, and improve range, speed, and payload of airplanes. Impact studies indicated that the aerodynamic and subsequent impact frequency may pose greater loads than does the first impact, therefore regarded as the most serious. A long afterbody externally is done the maximum impact loads on controlled during landing.

#### Propulsion

► **Power Plants.** Investigation has been made of a rectangular ramjet engine designed for installation in an aircraft wing. Experiments on the flow characteristics of the inlet and the cooling of the inlet engine. A study of the effect of exhaust pressure on a compressing engine showed only a small effect on cylinder temperature and heat rejection, which results in a small heat content, but an appreciable increase in cylinder temperature when engine exhaust was held constant. Studies of turbine and compressor streamlines where shown that control and stresses in the run could be relieved by relatively small changes in temperature distribution. An expansion investigation of selected hot turbine design, showing a control on the carbonization and the range of high temperature alloy, aggravates the re-oxidizing problem due to the diffuser exit is coefficient of expansion.

► **Push and Pull.** Work has been initiated on the development of a fuel using rocket engine for use as a switch tool for determining relative performance of various rocket propellants. An investigation of high speed tests in which was looking toward reduction of after burner effect, and therefore, a space vehicle high speed strength. An investigation of low velocity ("safety") tests indicates that for cold starting an auxiliary fuel of a higher volatility must

be used to facilitate this procedure.

► **Compressor.** An investigation of three blade curvatures indicates that an elliptical curvature produces the high tip velocity efficiency. Tip velocity below 1600 ft/sec, a parabolic blade highest efficiency at speeds of 1400 and 1600 ft/sec, and a circular curvature the highest efficiency at 1500 ft/sec. Fact that the operating range of a compressor is less sensitive to variation in tip velocity, producing some velocity and a reasonable flow producing range led to development of a surge inhibitor that compresses air from the compressor discharge. The inlet. This device increased the peak efficiency 5 percent and the peak pressure ratio 37 percent also increased the stable operating range of the compressor. A length study produced data showing optimum operating Mach number of various axial flow compressor blades of various shapes, thereby permitting design for maximum-stage pressure rise without decrease in efficiency due to compressive effects.

► **Turbine.** Blade data is being obtained on the effect of Mach number on turbine design through observation of performance, turbine over a range of pressure ratios across the turbine and dynamic analysis through comparison of the turbine inlet pressure to temperature, or both.

► **Combustion.** Research indicates that turbine combustion conditions are dependent on combustion chamber inlet conditions, the pressure drop through the combustor should be low, the temperature and velocity profiles at the combustor outlet should be even, and afterburning should be kept to a minimum. However, if turbulence is an important factor in achieving efficient stable combustion at unusually high rates of energy release, the effect of turbulence on combustion has been receiving the most attention in experimental study.

► **Jet Propeller.** A study of a propeller showed in gas jet engine from the blade tip indicates that the device would be considerably lighter than the conventional reciprocating engine with equivalent fuel consumption. However, it would be several times in great Application of the device depends on its plan and weight saving which would compensate for the high fuel consumption rate.

#### Turbine Construction

► **Structural Design.** Because wings of high speed aircraft are subject to such strength requirements that also in certain stresses requirements which affect factor safety, and therefore, new, discrete speed, and other characteristics, related stress theories have been evolved to permit more accurate determination of wing stiffness for

these wings, methods have been devised for the design of multi-bay wings without intermediate stiffening. For HST, TST, and C-HST magnesium alloy improved loading the new relative to thick skins were developed. Although previous methods for determining the coupled modes and the manner of control stresses are applicable only to straight wings, a new system has been evolved, through use of the energy method in conjunction with power series, which covers both the straight and swept wings.

Continuing the study of sandwich materials, a theory for small bending and stretching of sandwich shells, including the effect of transverse shear deformation, was presented. The influence pattern of experimental tests and theoretical studies in skin stiffness, punch, diagonal tension in beam action, stiffened shells and beam action, was considered, with important results.

► **Aluminum Metals.** Most of NACA's metal research is centered in the use of aluminum alloys. Included are studies concerning magnesium alloys, flying alloys, effects of corrosion, and fracture of metals.

► **Nonmetallic Aircraft Materials.** Research results were obtained on the fundamental properties of nonmetallic materials, effects of temperature on strength properties of laminated plastics, and mechanical properties of six different resins for use in aircraft structures.

#### Operating Problems

► **Disturbance.** As a continuation of the wartime research program, several of the large transport craft planned or in use by the airlines are under study to determine their disturbing characteristics. Dynamically similar scale models are either dropped into one of the towing tanks or projected into water from an outdoor catapult at equivalent air speeds and attitudes.

► **Handling Qualities.** In cooperation with the airlines, NACA has been investigating the flying and handling characteristics of transport craft, and the program that far has indicated that present flying and handling requirements are not too far from safe and easy operation with the various blind landing system. That program has emphasized the importance of increasing vision in the control system.

► **Locking.** Results of the extensive program to fight and avoid ice build-up on wing problems have proved highly satisfactory, with completion of a second season of all-weather operations in a specially-equipped Curtiss C-46 Commando transport. In addition, broad theoretical work has been obtained, enabling accurate calculation of complete deicing system requirements for any plane.

## ASSEMBLY LINE PRODUCED VALVES INDIVIDUALLY-ENGINEERED FOR THE BOEING SUPERFORTRESS



In designing the giant new B-50 Superfortress, Boeing engineers selected Whittaker Motor-Operated Valves for control of the vital fuel system. To meet the specialized requirements of the B-50, Whittaker engineers redesigned the basic motor valve pattern to include a special mounting design. In this mechanical engineering of field-proven design, combined with precision, assembly-line production techniques that make Whittaker valves the leading choice among the leaders in the aircraft industry.



**FAIRLY SMALL.**—Because Whittaker systems and actuators present no size obstacle, they can be used in small aircraft, helicopter units and unusual, difficult-to-install units.

**POWER FULFILLMENT.**—A motor operates, driving pump through drive gear reduction unit, 6 to 12 or 24 volt systems available with standard motor of 1/2 to 300 watt.

**SAFE RELIABLE MOUNTING.**—Two sets of lifting eye pins are provided on motor base. Design connects this entire bracket to fuselage, allowing flexible installation.

Whittaker has pioneered the development of over 175 different valves for the aircraft industry. Whittaker's staff of research engineers will engineer these field-proven designs to meet your specific requirements. Write for Engineering Sales Dept. for complete information. Wm. E. Whittaker Co., Ltd., 515 N. Cinci Ave., Los Angeles 38, Calif. Branch representatives: Aero Engineering Inc., Kansas City, Kansas; New York.

**Whittaker**

DESIGNERS • MANUFACTURERS • DISTRIBUTORS

SAVES AND MOTOR OPERATED SLIDING GATE, SHUT-OFF VALVES • SHAFT COUPLER • PUMP VALVE • 3 WAY VALVE VALVE • 4 WAY VALVE • PUMP VALVE • SHUT-OFF VALVE • HYDRAULIC COUPLER VALVE



## NEW AVIATION PRODUCTS

### Lightplane Tie-downs

Designed as convenient and effective means for tie-downing aircraft, but also for use on other aircraft, are three new tie-downs offered by Engineering Enterprises, 525 South Ardmore Ave., Los Angeles, Calif. Principle of tie-down is that its two parts are drawn into ground separately, then lock at 90 deg. to withstand conditions.



able force, and can only be pulled out by force in one. When plane is on tarmac, tie-downs pull parts individually. Weight of complete set is about 5 lb.

### Metall Working Bit

Specially assembled aircraft sheet metal bit, devised to cut grooving into an aircraft plane, is introduced by Aircraft Tools, Inc., 2305 E. 15th St., Los Angeles, Calif. Package contains 282 tools, completely used in sheet, portable box. Small tools used with set combination of accessories are as small as bits with products for reamers. Included are such tools as flat drill with angle drill head for close quarter drilling, conical drill, drill adapter, screw driver bit, Clem on hammer, George pressure air drill with Jacobs chuck, full range of twist bits, backing bar, assortment of cutters and hole saws, hand, wet separator sets, tap squares set, jigsaw spot flange, drill-out tool. Lifetime type measure, and box with tray drill.



### Cleaning Solvent

New cold cleaner for removing paint, dirt, grease, and carbon from metal parts is announced by Maplewood Products Co., St. Louis, Mo. Named Glacox "Metal Brite" Parts Cleaner, it is claimed to have fast action requiring little agitation even to severe cases.

### Socket Wrench Attachment

Designed to convert any two-deck socket wrench handle or attachment into a tightening device, is new Ratchetizer announced by Pinab Tool Co., Los Angeles 54, Calif. Designed to No. 5467, tool has four square plug with half-inch for holding socket wrench, also four square opening for insertion of handle or attachment, and a reversible ratcheting mechanism. Is intended primarily for use with large handle, large handle pin extension, a speed handle, or a longer wrench, it may be used with other non-ratcheting handles. Ratchetizer takes few positive engagement every 104 deg.



### Liquid Adhesives

Two new modified phenolic liquid adhesives designed for bonding metals, thermoplastic plastics, wood, fabric, or any combination of these, have been developed by General Electric Chemical Dept., Pittsfield, Mass. Designed as Nalco 12387 and 12359, these adhesives, when properly cured, are described as exhibiting high shear and tensile strength and exceptional resistance to water, gasoline, benzene, and acetone.

oil. Particular care is in connecting metal and laminate, proper metal-surface-type construction, attaching bracket and lap to this metal sheet, and the explosive force will. No welding or soldering is required when using these adhesives.

### For Temperature Data

Intended for instrument applications where space is limited, lightweight temperature transducer has 1 in. diameter in offered by G. M. Glenside & Co., Inc., 285 W. Caliente St., Pasadena 1, Calif. Change in position



of temperature sensitive by metallic element rotating standard incoherent potentiometer (resistor voltage output) large enough for recording with oscilloscope, galvanometer-recorder, and tele-recording system. In certain system application, device supplies ambient temperature at which instrument is measuring for interpretation and recording on ground. Resistance can be selected from 100 to 28,000 ohms. Designed for temperature ranges between -65 to 180 deg. C. and has linearity of 1%, accuracy of 1%, and sensitivity of 1 deg. C. or less. Standard response time is 2 sec. for 5-deg. temperature change.

### Calculating Chart

To reduce mental work of draftsman and machinist, H. M. Edwards Co., 6 East 39th St., New York, N. Y., is offering RapidCalc Chart. Device is said to speed addition and subtraction of fractions. It has no moving parts. Fractions to be added are entered on two edges of chart, then by following diagonal line from intersection of horizontal and vertical lines answer appears on bottom scale. If this only, on top scale if greater than unity. To subtract, procedure is reversed.



## FINANCIAL

### Aircraft Stocks Gain Over 1947; Upswing Shows Selective Pattern

While equities of all leading companies have passed last year's lows, only a few have exceeded former peaks.

General recovery in the market value of aircraft equities reveals a highly selective pattern.

All firms have made substantial gains over low points established during 1947. That is indicated in the accompanying table showing the market action of the common stocks of 17 major aircraft and aircraft equipment companies.

In only a few instances, however, have investors surpassed the peak prices recorded during 1947.

Best performer—Consolidated has proven to be the best performer by far among equities. Its recovery is consistent stock of which 50,000 shares outstanding, has more than doubled in price from its low point of last year and is about 45 percent above its best 1947 market trading. It is probable that this is reflected in the company's consistent past earnings and the favorable future outlook. As a true supplier of aircraft to the Navy, Consolidated has sufficient business on hand to maintain satisfactory operations over the immediate future.

The common equity of United Aircraft Corp. is up some 30 percent in price over 1947. This integrated aircraft unit has been successful in the stability of its operations, hence the relative new direction recorded during 1947.

The equity of Fairchild Engine and Airplane, percentage-wise, has demonstrated a very rapid recovery. The common stock has more than doubled in value since the 1947 low and is up about 23 percent from its best showing of last year. Some observers believe that this company's participation in the NEPA project may have been a factor.

Boeing equities the quartet of cost power whose equities have shown market appreciation over best 1947 quotations. In that instance, the investment is only 15 percent. In view of the large military backlog and its relatively favorable commercial transport development, Boeing has attracted a respectable market following.

Boeing and Douglas have been close in their best 1947 showing, but are up from 53 to 70 percent over their low points of last year.

► Variations—There are wide variations

among the fluctuations of the entire list. For example, of the remaining issues still some distance from their 1947 peaks, the depreciation ranges from 7 to 51 percent. Ryan is only 2 percent from its 1947 peak, while Martin is some 51 percent away.

The difficulties centering around the transport development of Martin are well known by now and are probably responsible for that market behavior. The Ryan action is of very recent origin and is a reflection of the accumulated orders for parts received from other aircraft builders. Also, the company's annual price reductions of a 50 cents per share dividend was not without its market effect.

The units commonly associated with the recovery phase of the aircraft business, have not performed very better, either, than the aircraft builders. For example, Sperry, which has the best record in this category, is almost at its best 1947 price and about 30 percent up from its low point. Bendix and Thompson Products, however, have almost reached market action, being 28 and 22 percent, respectively, away from their best prices of last year.

It is not generally realized, but the character of Sperry, Bendix, and Thompson Products has changed considerably. They can no longer be considered as exclusive aircraft accessory suppliers. Sperry, for instance, went on to manufacture a wide range of aircraft products but somehow has always been classified in this category. The company

has long had a strong position in main-line transport instruments. Both Bendix and Thompson Products have since their respective have widely diversified in supplies to the automotive industry.

► Policy Reports Effects—The recent flurry in aviation securities received their first impetus with the release of the report of the President's Air Policy Commission early in January. After a brief rest period, aircraft securities received another shot in the arm at the time of the release of the report of the Congressional Aviation Policy Board on March 1. Implications of substantially increased aircraft appropriations were made also that report and more market animation was available.

Reaction quarters, however, have persistently continued against the likelihood of substantially increased aircraft appropriations being voted in an election year when strong railroads would like to effect a cut in the use of the national budget, and also reduce taxes. The law limits a dangerous reliance on aircraft starts from now on.

Nevertheless, the troubled international picture has driven home the realization that regardless of unbalanced budgets, increased aircraft appropriations will be forthcoming. It is this factor which appears to be continuing the strength in aircraft shares.

There is little doubt that if the aircraft industry, as a whole, is to enjoy profitable operations during 1949 and beyond, increased appropriations for aircraft development must be voted at the current session of Congress.

As in the past the participation of the private aircraft units in the composite aerospace pool will differ widely. This is the key to the highly selective pattern which prevails. The extent in the private sector will not decline in the same pattern in the subsequent price fluctuations. The recent upswing again showed a different composition of companies and further changes are probable because the present cycle is completed.

—Selig Ahlhead

### CURRENT MARKET RECOVERY Leading Aircraft Stocks

Company	1947 Low	30 Day High	Price March 11, 1948	% Change Since 1947 High
Boeing	8 1/2	10	10 1/2	+10%
Bell	15 1/2	16 1/2	16 1/2	—
Bendix	17 1/2	20 1/2	21 1/2	+10%
Boeing	24 1/2	26 1/2	26 1/2	—
Consolidated	1 1/2	1 1/2	1 1/2	—
Curtis-Wright	5 1/2	6 1/2	6 1/2	+10%
Douglas	6 1/2	7 1/2	7 1/2	+10%
Fairchild & A.	1 1/2	1 1/2	1 1/2	+10%
General Electric	17 1/2	17 1/2	17 1/2	—
Lockheed	17 1/2	17 1/2	17 1/2	—
Martin	34 1/2	34 1/2	34 1/2	—
Northrop	17 1/2	17 1/2	17 1/2	—
Republic	4 1/2	4 1/2	4 1/2	—
Sperry	24 1/2	24 1/2	24 1/2	—
Thompson Products	21 1/2	21 1/2	21 1/2	—
United Aircraft	38 1/2	41 1/2	41 1/2	+10%

## NEW EFFICIENCY... LARGER PROFITS on VALVE SERVICE



### with **SIOUX** **UNI-VALVE** **SHOP** No. 1795

Here's the economical method of providing adequate and compact space for your precision valve service equipment. A real Work Bench. Everything handy—saves time and increases efficiency. Durable construction of sheet steel with white enamel finish.

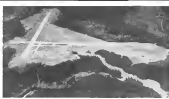
everything handy—saves time and increases efficiency. Durable construction of sheet steel with white enamel finish.

Has built-in disappearing rack for holding cylinder heads. Backs for holding valves in sequence. Space for SIOUX Units (not included) such as Valve Grinding Machine, Seat Grinder set, Servo-Tool-Dor Panel, Valve Cleaner, Vacuum Dressing Unit, also cabinet space for wrenches and other valve service equipment. Length 8 ft.; Height 6 ft.; Depth 28 in.; Bench height 33 in. Get details from your SIOUX Distributor.

Sold Only Through Authorized SIOUX Distributors



## SALES & SERVICE



**AIRPORT ENGINEERING UNDER HANDICAPS**

Kennedy Airport, Charleston, W. Va., which opened Dec. 1, 1947, to replace obsolete Bessie Coleman, Eastern, Capital and All-American Airlines lines, involved the enormous engineering task of carving some 2,000,000 cu. yds. of earth and rock. Piedmont Airway was also scheduled to start operations out of the field. Every square foot of the airport surface involving runway and taxiway was carefully graded with expenditures of more than \$6,000,000. Another \$1,500,000 will be needed for completion of a third runway and other construction. Kennedy Airport has been under construction since 1939; it probably the most rapid airport engineering project in the U. S.

## New CAA Airport Standards In Proposed Manual Revisions

Changes planned are to shorten Class I runways to 1500 ft. minimum and revise airport approach zone requirements to conform to ICAO.

By ALEXANDER M. SURELY

Important changes in CAA airport standards soon will be forthcoming. Those will be in revisions of the CAA airport design manual previously published in 1944 and in design manuals for airport pavements.

Tentative action being considered for current work virtually eliminate the 1800-ft. class report by showing standards for the small private air field. Ownership airports are recognized and runways as short as 1500 ft., instead of the 1800 ft. previous minimum for Class I are considered adequate.

Still in process is the action of the new manual dealing with airport approach zone standards.

National Association of State Aeronautics Officials, which has been discussing the proposed changes with CAA, says the airport approach zone standards are to conform as nearly as possible with

the standards adopted by International Civil Aviation Organization. In general, diameter of the turning zone has been reduced for Class III and smaller airports. A downing indicator is a 1:18 approach slope for Class I and Class II fields and a 1:40 slope for larger fields.

► **Zoning Changes**—NABAO points out that the forthcoming change in approach zoning will recognize changes in static zoning laws and municipal ordinances, although local government officials were not consulted in preparation of the ICAO standards.

Proving manual standards generally will conform to the runway strength and dimensions standards set out but left in a CAA technical order for air carrier operations. These also conform to the ICAO proposed international standards, except in case of landing strip width. They provided for a main

runway leading up ahead of 100,000 ft. for the heaviest runways, or 125,000 ft. for dual wheel landing gear. The double wheel tandem gear such as is used on the Consolidated Valtec B-36 and NC-99 is taken into consideration by a rule which says "where gross weight of aircraft with dual wheels will be more than double dual-wheel pavement loading, the excess load will be transmitted to the pavement by additional units."

► **Stronger Taxway-CAA runway engineers say that new paving requirements still in process of development probably will ease up slightly on strength requirements of runways themselves, due to experience there for with larger planes. But they likely will increase strength requirements for taxiways and aprons. Current requirements in some cases have been insufficient when traffic was heavier than expected.**

Runway lengths and technical order sets at from 1500 ft. minimum for feeder airports, to 5000 ft. minimum for international airports are listed for sea level elevation and standard sea level temperatures of 59 deg. F. Runway lengths are to be maximum, however, at the rate of 7 percent at the length shown on the table for each 1000 ft. of elevation above sea level. This corrected length is to be further increased by one foot of 1 percent for each degree in which the mean temperature at the hottest month of the year, averaged over a period of years, exceeds the standard 59 degree temperature.

To illustrate a runway for a feeder class airport which had a 3000 ft. elevation and a mean temperature of 79 deg. for its hottest month of the year would have to have added to the standard 1500 ft. length, 345 ft. for the 1000 ft. altitude and 150 ft. for the extra 20 deg. of temperature. The total runway length under such altitude and temperature conditions would be 4995 ft. instead of 1500 ft.

► **Grade Requirements**—There is still another requirement that the runway length shall be increased to correct for runway gradient. This would be at the rate of 20 percent of the length considered for level ground for each 1 percent of effective runway grade. The effective runway gradient is determined by dividing the maximum difference in runway centerline elevation by the total length of the runway. The maximum grade at any portion of the runway shall not exceed 11 percent, effective gradient 1 percent.

The new runway lengths tentatively prescribed call for 1500 to 2500 ft. for Class I fields, 3000 to 3500 ft. for Class II fields, 3500 to 4000 ft. for Class III fields, 4000 to 4500 ft. for Class IV fields, 4500 to 5000 ft. for Class V fields, 5000 to 5500 ft. for Class VI fields, 5500 to 6000 ft. for Class VII fields, 6000 to 6500 ft. for Class VIII fields, 6500 to 7000 ft. for Class IX fields, 7000 to 7500 ft. for Class X fields, 7500 to 8000 ft. for Class XI fields, 8000 to 8500 ft. for Class XII fields, 8500 to 9000 ft. for Class XIII fields, 9000 to 9500 ft. for Class XIV fields, 9500 to 10,000 ft. for Class XV fields, 10,000 to 10,500 ft. for Class XVI fields, 10,500 to 11,000 ft. for Class XVII fields, 11,000 to 11,500 ft. for Class XVIII fields, 11,500 to 12,000 ft. for Class XIX fields, 12,000 to 12,500 ft. for Class XX fields, 12,500 to 13,000 ft. for Class XXI fields, 13,000 to 13,500 ft. for Class XXII fields, 13,500 to 14,000 ft. for Class XXIII fields, 14,000 to 14,500 ft. for Class XXIV fields, 14,500 to 15,000 ft. for Class XXV fields, 15,000 to 15,500 ft. for Class XXVI fields, 15,500 to 16,000 ft. for Class XXVII fields, 16,000 to 16,500 ft. for Class XXVIII fields, 16,500 to 17,000 ft. for Class XXIX fields, 17,000 to 17,500 ft. for Class XXX fields, 17,500 to 18,000 ft. for Class XXXI fields, 18,000 to 18,500 ft. for Class XXXII fields, 18,500 to 19,000 ft. for Class XXXIII fields, 19,000 to 19,500 ft. for Class XXXIV fields, 19,500 to 20,000 ft. for Class XXXV fields, 20,000 to 20,500 ft. for Class XXXVI fields, 20,500 to 21,000 ft. for Class XXXVII fields, 21,000 to 21,500 ft. for Class XXXVIII fields, 21,500 to 22,000 ft. for Class XXXIX fields, 22,000 to 22,500 ft. for Class XXXX fields, 22,500 to 23,000 ft. for Class XXXXI fields, 23,000 to 23,500 ft. for Class XXXXII fields, 23,500 to 24,000 ft. for Class XXXXIII fields, 24,000 to 24,500 ft. for Class XXXXIV fields, 24,500 to 25,000 ft. for Class XXXXV fields, 25,000 to 25,500 ft. for Class XXXXVI fields, 25,500 to 26,000 ft. for Class XXXXVII fields, 26,000 to 26,500 ft. for Class XXXXVIII fields, 26,500 to 27,000 ft. for Class XXXXIX fields, 27,000 to 27,500 ft. for Class XXXXX fields, 27,500 to 28,000 ft. for Class XXXXXI fields, 28,000 to 28,500 ft. for Class XXXXXII fields, 28,500 to 29,000 ft. for Class XXXXXIII fields, 29,000 to 29,500 ft. for Class XXXXXIV fields, 29,500 to 30,000 ft. for Class XXXXXV fields, 30,000 to 30,500 ft. for Class XXXXXVI fields, 30,500 to 31,000 ft. for Class XXXXXVII fields, 31,000 to 31,500 ft. for Class XXXXXVIII fields, 31,500 to 32,000 ft. for Class XXXXXIX fields, 32,000 to 32,500 ft. for Class XXXXXX fields, 32,500 to 33,000 ft. for Class XXXXXI fields, 33,000 to 33,500 ft. for Class XXXXXII fields, 33,500 to 34,000 ft. for Class XXXXXIII fields, 34,000 to 34,500 ft. for Class XXXXXIV fields, 34,500 to 35,000 ft. for Class XXXXXV fields, 35,000 to 35,500 ft. for Class XXXXXVI fields, 35,500 to 36,000 ft. for Class XXXXXVII fields, 36,000 to 36,500 ft. for Class XXXXXVIII fields, 36,500 to 37,000 ft. for Class XXXXXIX fields, 37,000 to 37,500 ft. for Class XXXXXX fields, 37,500 to 38,000 ft. for Class XXXXXI fields, 38,000 to 38,500 ft. for Class XXXXXII fields, 38,500 to 39,000 ft. for Class XXXXXIII fields, 39,000 to 39,500 ft. for Class XXXXXIV fields, 39,500 to 40,000 ft. for Class XXXXXV fields, 40,000 to 40,500 ft. for Class XXXXXVI fields, 40,500 to 41,000 ft. for Class XXXXXVII fields, 41,000 to 41,500 ft. for Class XXXXXVIII fields, 41,500 to 42,000 ft. for Class XXXXXIX fields, 42,000 to 42,500 ft. for Class XXXXXX fields, 42,500 to 43,000 ft. for Class XXXXXI fields, 43,000 to 43,500 ft. for Class XXXXXII fields, 43,500 to 44,000 ft. for Class XXXXXIII fields, 44,000 to 44,500 ft. for Class XXXXXIV fields, 44,500 to 45,000 ft. for Class XXXXXV fields, 45,000 to 45,500 ft. for Class XXXXXVI fields, 45,500 to 46,000 ft. for Class XXXXXVII fields, 46,000 to 46,500 ft. for Class XXXXXVIII fields, 46,500 to 47,000 ft. for Class XXXXXIX fields, 47,000 to 47,500 ft. for Class XXXXXX fields, 47,500 to 48,000 ft. for Class XXXXXI fields, 48,000 to 48,500 ft. for Class XXXXXII fields, 48,500 to 49,000 ft. for Class XXXXXIII fields, 49,000 to 49,500 ft. for Class XXXXXIV fields, 49,500 to 50,000 ft. for Class XXXXXV fields, 50,000 to 50,500 ft. for Class XXXXXVI fields, 50,500 to 51,000 ft. for Class XXXXXVII fields, 51,000 to 51,500 ft. for Class XXXXXVIII fields, 51,500 to 52,000 ft. for Class XXXXXIX fields, 52,000 to 52,500 ft. for Class XXXXXX fields, 52,500 to 53,000 ft. for Class XXXXXI fields, 53,000 to 53,500 ft. for Class XXXXXII fields, 53,500 to 54,000 ft. for Class XXXXXIII fields, 54,000 to 54,500 ft. for Class XXXXXIV fields, 54,500 to 55,000 ft. for Class XXXXXV fields, 55,000 to 55,500 ft. for Class XXXXXVI fields, 55,500 to 56,000 ft. for Class XXXXXVII fields, 56,000 to 56,500 ft. for Class XXXXXVIII fields, 56,500 to 57,000 ft. for Class XXXXXIX fields, 57,000 to 57,500 ft. for Class XXXXXX fields, 57,500 to 58,000 ft. for Class XXXXXI fields, 58,000 to 58,500 ft. for Class XXXXXII fields, 58,500 to 59,000 ft. for Class XXXXXIII fields, 59,000 to 59,500 ft. for Class XXXXXIV fields, 59,500 to 60,000 ft. for Class XXXXXV fields, 60,000 to 60,500 ft. for Class XXXXXVI fields, 60,500 to 61,000 ft. for Class XXXXXVII fields, 61,000 to 61,500 ft. for Class XXXXXVIII fields, 61,500 to 62,000 ft. for Class XXXXXIX fields, 62,000 to 62,500 ft. for Class XXXXXX fields, 62,500 to 63,000 ft. for Class XXXXXI fields, 63,000 to 63,500 ft. for Class XXXXXII fields, 63,500 to 64,000 ft. for Class XXXXXIII fields, 64,000 to 64,500 ft. for Class XXXXXIV fields, 64,500 to 65,000 ft. for Class XXXXXV fields, 65,000 to 65,500 ft. for Class XXXXXVI fields, 65,500 to 66,000 ft. for Class XXXXXVII fields, 66,000 to 66,500 ft. for Class XXXXXVIII fields, 66,500 to 67,000 ft. for Class XXXXXIX fields, 67,000 to 67,500 ft. for Class XXXXXX fields, 67,500 to 68,000 ft. for Class XXXXXI fields, 68,000 to 68,500 ft. for Class XXXXXII fields, 68,500 to 69,000 ft. for Class XXXXXIII fields, 69,000 to 69,500 ft. for Class XXXXXIV fields, 69,500 to 70,000 ft. for Class XXXXXV fields, 70,000 to 70,500 ft. for Class XXXXXVI fields, 70,500 to 71,000 ft. for Class XXXXXVII fields, 71,000 to 71,500 ft. for Class XXXXXVIII fields, 71,500 to 72,000 ft. for Class XXXXXIX fields, 72,000 to 72,500 ft. for Class XXXXXX fields, 72,500 to 73,000 ft. for Class XXXXXI fields, 73,000 to 73,500 ft. for Class XXXXXII fields, 73,500 to 74,000 ft. for Class XXXXXIII fields, 74,000 to 74,500 ft. for Class XXXXXIV fields, 74,500 to 75,000 ft. for Class XXXXXV fields, 75,000 to 75,500 ft. for Class XXXXXVI fields, 75,500 to 76,000 ft. for Class XXXXXVII fields, 76,000 to 76,500 ft. for Class XXXXXVIII fields, 76,500 to 77,000 ft. for Class XXXXXIX fields, 77,000 to 77,500 ft. for Class XXXXXX fields, 77,500 to 78,000 ft. for Class XXXXXI fields, 78,000 to 78,500 ft. for Class XXXXXII fields, 78,500 to 79,000 ft. for Class XXXXXIII fields, 79,000 to 79,500 ft. for Class XXXXXIV fields, 79,500 to 80,000 ft. for Class XXXXXV fields, 80,000 to 80,500 ft. for Class XXXXXVI fields, 80,500 to 81,000 ft. for Class XXXXXVII fields, 81,000 to 81,500 ft. for Class XXXXXVIII fields, 81,500 to 82,000 ft. for Class XXXXXIX fields, 82,000 to 82,500 ft. for Class XXXXXX fields, 82,500 to 83,000 ft. for Class XXXXXI fields, 83,000 to 83,500 ft. for Class XXXXXII fields, 83,500 to 84,000 ft. for Class XXXXXIII fields, 84,000 to 84,500 ft. for Class XXXXXIV fields, 84,500 to 85,000 ft. for Class XXXXXV fields, 85,000 to 85,500 ft. for Class XXXXXVI fields, 85,500 to 86,000 ft. for Class XXXXXVII fields, 86,000 to 86,500 ft. for Class XXXXXVIII fields, 86,500 to 87,000 ft. for Class XXXXXIX fields, 87,000 to 87,500 ft. for Class XXXXXX fields, 87,500 to 88,000 ft. for Class XXXXXI fields, 88,000 to 88,500 ft. for Class XXXXXII fields, 88,500 to 89,000 ft. for Class XXXXXIII fields, 89,000 to 89,500 ft. for Class XXXXXIV fields, 89,500 to 90,000 ft. for Class XXXXXV fields, 90,000 to 90,500 ft. for Class XXXXXVI fields, 90,500 to 91,000 ft. for Class XXXXXVII fields, 91,000 to 91,500 ft. for Class XXXXXVIII fields, 91,500 to 92,000 ft. for Class XXXXXIX fields, 92,000 to 92,500 ft. for Class XXXXXX fields, 92,500 to 93,000 ft. for Class XXXXXI fields, 93,000 to 93,500 ft. for Class XXXXXII fields, 93,500 to 94,000 ft. for Class XXXXXIII fields, 94,000 to 94,500 ft. for Class XXXXXIV fields, 94,500 to 95,000 ft. for Class XXXXXV fields, 95,000 to 95,500 ft. for Class XXXXXVI fields, 95,500 to 96,000 ft. for Class XXXXXVII fields, 96,000 to 96,500 ft. for Class XXXXXVIII fields, 96,500 to 97,000 ft. for Class XXXXXIX fields, 97,000 to 97,500 ft. for Class XXXXXX fields, 97,500 to 98,000 ft. for Class XXXXXI fields, 98,000 to 98,500 ft. for Class XXXXXII fields, 98,500 to 99,000 ft. for Class XXXXXIII fields, 99,000 to 99,500 ft. for Class XXXXXIV fields, 99,500 to 100,000 ft. for Class XXXXXV fields, 100,000 to 100,500 ft. for Class XXXXXVI fields, 100,500 to 101,000 ft. for Class XXXXXVII fields, 101,000 to 101,500 ft. for Class XXXXXVIII fields, 101,500 to 102,000 ft. for Class XXXXXIX fields, 102,000 to 102,500 ft. for Class XXXXXX fields, 102,500 to 103,000 ft. for Class XXXXXI fields, 103,000 to 103,500 ft. for Class XXXXXII fields, 103,500 to 104,000 ft. for Class XXXXXIII fields, 104,000 to 104,500 ft. for Class XXXXXIV fields, 104,500 to 105,000 ft. for Class XXXXXV fields, 105,000 to 105,500 ft. for Class XXXXXVI fields, 105,500 to 106,000 ft. for Class XXXXXVII fields, 106,000 to 106,500 ft. for Class XXXXXVIII fields, 106,500 to 107,000 ft. for Class XXXXXIX fields, 107,000 to 107,500 ft. for Class XXXXXX fields, 107,500 to 108,000 ft. for Class XXXXXI fields, 108,000 to 108,500 ft. for Class XXXXXII fields, 108,500 to 109,000 ft. for Class XXXXXIII fields, 109,000 to 109,500 ft. for Class XXXXXIV fields, 109,500 to 110,000 ft. for Class XXXXXV fields, 110,000 to 110,500 ft. for Class XXXXXVI fields, 110,500 to 111,000 ft. for Class XXXXXVII fields, 111,000 to 111,500 ft. for Class XXXXXVIII fields, 111,500 to 112,000 ft. for Class XXXXXIX fields, 112,000 to 112,500 ft. for Class XXXXXX fields, 112,500 to 113,000 ft. for Class XXXXXI fields, 113,000 to 113,500 ft. for Class XXXXXII fields, 113,500 to 114,000 ft. for Class XXXXXIII fields, 114,000 to 114,500 ft. for Class XXXXXIV fields, 114,500 to 115,000 ft. for Class XXXXXV fields, 115,000 to 115,500 ft. for Class XXXXXVI fields, 115,500 to 116,000 ft. for Class XXXXXVII fields, 116,000 to 116,500 ft. for Class XXXXXVIII fields, 116,500 to 117,000 ft. for Class XXXXXIX fields, 117,000 to 117,500 ft. for Class XXXXXX fields, 117,500 to 118,000 ft. for Class XXXXXI fields, 118,000 to 118,500 ft. for Class XXXXXII fields, 118,500 to 119,000 ft. for Class XXXXXIII fields, 119,000 to 119,500 ft. for Class XXXXXIV fields, 119,500 to 120,000 ft. for Class XXXXXV fields, 120,000 to 120,500 ft. for Class XXXXXVI fields, 120,500 to 121,000 ft. for Class XXXXXVII fields, 121,000 to 121,500 ft. for Class XXXXXVIII fields, 121,500 to 122,000 ft. for Class XXXXXIX fields, 122,000 to 122,500 ft. for Class XXXXXX fields, 122,500 to 123,000 ft. for Class XXXXXI fields, 123,000 to 123,500 ft. for Class XXXXXII fields, 123,500 to 124,000 ft. for Class XXXXXIII fields, 124,000 to 124,500 ft. for Class XXXXXIV fields, 124,500 to 125,000 ft. for Class XXXXXV fields, 125,000 to 125,500 ft. for Class XXXXXVI fields, 125,500 to 126,000 ft. for Class XXXXXVII fields, 126,000 to 126,500 ft. for Class XXXXXVIII fields, 126,500 to 127,000 ft. for Class XXXXXIX fields, 127,000 to 127,500 ft. for Class XXXXXX fields, 127,500 to 128,000 ft. for Class XXXXXI fields, 128,000 to 128,500 ft. for Class XXXXXII fields, 128,500 to 129,000 ft. for Class XXXXXIII fields, 129,000 to 129,500 ft. for Class XXXXXIV fields, 129,500 to 130,000 ft. for Class XXXXXV fields, 130,000 to 130,500 ft. for Class XXXXXVI fields, 130,500 to 131,000 ft. for Class XXXXXVII fields, 131,000 to 131,500 ft. for Class XXXXXVIII fields, 131,500 to 132,000 ft. for Class XXXXXIX fields, 132,000 to 132,500 ft. for Class XXXXXX fields, 132,500 to 133,000 ft. for Class XXXXXI fields, 133,000 to 133,500 ft. for Class XXXXXII fields, 133,500 to 134,000 ft. for Class XXXXXIII fields, 134,000 to 134,500 ft. for Class XXXXXIV fields, 134,500 to 135,000 ft. for Class XXXXXV fields, 135,000 to 135,500 ft. for Class XXXXXVI fields, 135,500 to 136,000 ft. for Class XXXXXVII fields, 136,000 to 136,500 ft. for Class XXXXXVIII fields, 136,500 to 137,000 ft. for Class XXXXXIX fields, 137,000 to 137,500 ft. for Class XXXXXX fields, 137,500 to 138,000 ft. for Class XXXXXI fields, 138,000 to 138,500 ft. for Class XXXXXII fields, 138,500 to 139,000 ft. for Class XXXXXIII fields, 139,000 to 139,500 ft. for Class XXXXXIV fields, 139,500 to 140,000 ft. for Class XXXXXV fields, 140,000 to 140,500 ft. for Class XXXXXVI fields, 140,500 to 141,000 ft. for Class XXXXXVII fields, 141,000 to 141,500 ft. for Class XXXXXVIII fields, 141,500 to 142,000 ft. for Class XXXXXIX fields, 142,000 to 142,500 ft. for Class XXXXXX fields, 142,500 to 143,000 ft. for Class XXXXXI fields, 143,000 to 143,500 ft. for Class XXXXXII fields, 143,500 to 144,000 ft. for Class XXXXXIII fields, 144,000 to 144,500 ft. for Class XXXXXIV fields, 144,500 to 145,000 ft. for Class XXXXXV fields, 145,000 to 145,500 ft. for Class XXXXXVI fields, 145,500 to 146,000 ft. for Class XXXXXVII fields, 146,000 to 146,500 ft. for Class XXXXXVIII fields, 146,500 to 147,000 ft. for Class XXXXXIX fields, 147,000 to 147,500 ft. for Class XXXXXX fields, 147,500 to 148,000 ft. for Class XXXXXI fields, 148,000 to 148,500 ft. for Class XXXXXII fields, 148,500 to 149,000 ft. for Class XXXXXIII fields, 149,000 to 149,500 ft. for Class XXXXXIV fields, 149,500 to 150,000 ft. for Class XXXXXV fields, 150,000 to 150,500 ft. for Class XXXXXVI fields, 150,500 to 151,000 ft. for Class XXXXXVII fields, 151,000 to 151,500 ft. for Class XXXXXVIII fields, 151,500 to 152,000 ft. for Class XXXXXIX fields, 152,000 to 152,500 ft. for Class XXXXXX fields, 152,500 to 153,000 ft. for Class XXXXXI fields, 153,000 to 153,500 ft. for Class XXXXXII fields, 153,500 to 154,000 ft. for Class XXXXXIII fields, 154,000 to 154,500 ft. for Class XXXXXIV fields, 154,500 to 155,000 ft. for Class XXXXXV fields, 155,000 to 155,500 ft. for Class XXXXXVI fields, 155,500 to 156,000 ft. for Class XXXXXVII fields, 156,000 to 156,500 ft. for Class XXXXXVIII fields, 156,500 to 157,000 ft. for Class XXXXXIX fields, 157,000 to 157,500 ft. for Class XXXXXX fields, 157,500 to 158,000 ft. for Class XXXXXI fields, 158,000 to 158,500 ft. for Class XXXXXII fields, 158,500 to 159,000 ft. for Class XXXXXIII fields, 159,000 to 159,500 ft. for Class XXXXXIV fields, 159,500 to 160,000 ft. for Class XXXXXV fields, 160,000 to 160,500 ft. for Class XXXXXVI fields, 160,500 to 161,000 ft. for Class XXXXXVII fields, 161,000 to 161,500 ft. for Class XXXXXVIII fields, 161,500 to 162,000 ft. for Class XXXXXIX fields, 162,000 to 162,500 ft. for Class XXXXXX fields, 162,500 to 163,000 ft. for Class XXXXXI fields, 163,000 to 163,500 ft. for Class XXXXXII fields, 163,500 to 164,000 ft. for Class XXXXXIII fields, 164,000 to 164,500 ft. for Class XXXXXIV fields, 164,500 to 165,000 ft. for Class XXXXXV fields, 165,000 to 165,500 ft. for Class XXXXXVI fields, 165,500 to 166,000 ft. for Class XXXXXVII fields, 166,000 to 166,500 ft. for Class XXXXXVIII fields, 166,500 to 167,000 ft. for Class XXXXXIX fields, 167,000 to 167,500 ft. for Class XXXXXX fields, 167,500 to 168,000 ft. for Class XXXXXI fields, 168,000 to 168,500 ft. for Class XXXXXII fields, 168,500 to 169,000 ft. for Class XXXXXIII fields, 169,000 to 169,500 ft. for Class XXXXXIV fields, 169,500 to 170,000 ft. for Class XXXXXV fields, 170,000 to 170,500 ft. for Class XXXXXVI fields, 170,500 to 171,000 ft. for Class XXXXXVII fields, 171,000 to 171,500 ft. for Class XXXXXVIII fields, 171,500 to 172,000 ft. for Class XXXXXIX fields, 172,000 to 172,500 ft. for Class XXXXXX fields, 172,500 to 173,000 ft. for Class XXXXXI fields, 173,000 to 173,500 ft. for Class XXXXXII fields, 173,500 to 174,000 ft. for Class XXXXXIII fields, 174,000 to 174,500 ft. for Class XXXXXIV fields, 174,500 to 175,000 ft. for Class XXXXXV fields, 175,000 to 175,500 ft. for Class XXXXXVI fields, 175,500 to 176,000 ft. for Class XXXXXVII fields, 176,000 to 176,500 ft. for Class XXXXXVIII fields, 176,500 to 177,000 ft. for Class XXXXXIX fields, 177,000 to 177,500 ft. for Class XXXXXX fields, 177,500 to 178,000 ft. for Class XXXXXI fields, 178,000 to 178,500 ft. for Class XXXXXII fields, 178,500 to 179,000 ft. for Class XXXXXIII fields, 179,000 to 179,500 ft. for Class XXXXXIV fields, 179,500 to 180,000 ft. for Class XXXXXV fields, 180,000 to 180,500 ft. for Class XXXXXVI fields, 180,500 to 181,000 ft. for Class XXXXXVII fields, 181,000 to 181,500 ft. for Class XXXXXVIII fields, 181,500 to 182,000 ft. for Class XXXXXIX fields, 182,000 to 182,500 ft. for Class XXXXXX fields, 182,500 to 183,000 ft. for Class XXXXXI fields, 183,000 to 183,500 ft. for Class XXXXXII fields, 183,500 to 184,000 ft. for Class XXXXXIII fields, 184,000 to 184,500 ft. for Class XXXXXIV fields, 184,500 to 185,000 ft. for Class XXXXXV fields, 185,000 to 185,500 ft. for Class XXXXXVI fields, 185,500 to 186,000 ft. for Class XXXXXVII fields, 186,000 to 186,500 ft. for Class XXXXXVIII fields, 186,500 to 187,000 ft. for Class XXXXXIX fields, 187,000 to 187,500 ft. for Class XXXXXX fields, 187,500 to 188,000 ft. for Class XXXXXI fields, 188,000 to 188,500 ft. for Class XXXXXII fields, 188,500 to 189,000 ft. for Class XXXXXIII fields, 189,000 to 189,500 ft. for Class XXXXXIV fields, 189,500 to 190,000 ft. for Class XXXXXV fields, 190,000 to 190,500 ft. for Class XXXXXVI fields, 190,500 to 191,000 ft. for Class XXXXXVII fields, 191,000 to 191,500 ft. for Class XXXXXVIII fields, 191,500 to 192,000 ft. for Class XXXXXIX fields, 192,000 to 192,500 ft. for Class XXXXXX fields, 192,500 to 193,000 ft. for Class XXXXXI fields, 193,000 to 193,500 ft. for Class XXXXXII fields, 193,500 to 194,000 ft. for Class XXXXXIII fields, 194,000 to 194,500 ft. for Class XXXXXIV fields, 194,500 to 195,000 ft. for Class XXXXXV fields, 195,000 to 195,500 ft. for Class XXXXXVI fields, 195,500 to 196,000 ft. for Class XXXXXVII fields, 196,000 to 196,500 ft. for Class XXXXXVIII fields, 196,500 to 197,000 ft. for Class XXXXXIX fields, 197,000 to 197,500 ft. for Class XXXXXX fields, 197,500 to 198,000 ft. for Class XXXXXI fields, 198,000 to 198,500 ft. for Class XXXXXII fields, 198,500 to 199,000 ft. for Class XXXXXIII fields, 199,000 to 199,500 ft. for Class XXXXXIV fields, 199,500 to 200,000 ft. for Class XXXXXV fields, 200,000 to 200,500 ft. for Class XXXXXVI fields, 200,500 to 201,000 ft. for Class XXXXXVII fields, 201,000 to 201,500 ft. for Class XXXXXVIII fields, 201,500 to 202,000 ft. for Class XXXXXIX fields, 202,000 to 202,500 ft. for Class XXXXXX fields, 202,500 to 203,000 ft. for Class XXXXXI fields, 203,000 to 203,500 ft. for Class XXXXXII fields, 203,500 to 204,000 ft. for Class XXXXXIII fields, 204,000 to 204,500 ft. for Class XXXXXIV fields, 204,500 to 205,000 ft. for Class XXXXXV fields, 205,000 to 205,500 ft. for Class XXXXXVI fields, 205,500 to 206,000 ft. for Class XXXXXVII fields, 206,000 to 206,500 ft. for Class XXXXXVIII fields, 206,500 to 207,000 ft. for Class XXXXXIX fields, 207,00

## More Civilian Planes Registered in 1947

An increase of 13,819 civil aircraft in the United States during 1947 is shown in the latest publication of CAA.

Total of 94,321 civil aircraft was registered on Jan. 1 of this year compared with 81,002 a year ago. California continues as the state flying leader with 10,221 planes. Texas is second with 8340. Wisconsin has the lowest with only 187, ranking just below Rhode Island's 199. Helicopters showed an increase of 73 during the year with 133 now registered.

Tabulation of civil aircraft registered by counties can be obtained from CAA headquarters, Washington 25, D. C.

Breakdown of registered civil aircraft by states follows:

	Jan. 1, 1946	Jan. 1, 1947
Ala.	884	986
Ark.	1074	1131
Cal.	10,221	10,221
Col.	10,221	10,221
Conn.	10,221	10,221
Del.	10,221	10,221
D. C.	10,221	10,221
Fla.	10,221	10,221
Ga.	10,221	10,221
Id.	10,221	10,221
Ill.	10,221	10,221
Ind.	10,221	10,221
Iowa	10,221	10,221
Kan.	10,221	10,221
Ky.	10,221	10,221
La.	10,221	10,221
Me.	10,221	10,221
Mass.	10,221	10,221
Mich.	10,221	10,221
Minn.	10,221	10,221
Miss.	10,221	10,221
Mo.	10,221	10,221
Mont.	10,221	10,221
Neb.	10,221	10,221
Nev.	10,221	10,221
N.H.	10,221	10,221
N.J.	10,221	10,221
N.M.	10,221	10,221
N.Y.	10,221	10,221
Ohio	10,221	10,221
Ore.	10,221	10,221
Pack.	10,221	10,221
R.I.	10,221	10,221
S.D.	10,221	10,221
Tenn.	10,221	10,221
Tex.	8,340	8,340
Va.	10,221	10,221
Wash.	10,221	10,221
W. Va.	10,221	10,221
Wis.	1,870	1,870
Wyo.	10,221	10,221
Total	81,002	94,321

## AOA's Members Rate 705 Airports Superior

Members of the Aircraft Owners and Pilots Association rated 705, or 12 percent, of the nation's 5900 airports "above average" or "superior" during the September-January rating period. A sharp gain in rated airports since AOPA's first survey period ending June 1, 1947, was noted. The jump from 445 to 705 rated airports is attributed by AOPA officials to widespread publicity given these airport ratings by the press and the increasing business competition in aircraft sales and service.

Usual note of the current rating period was the inclusion of 18 "above average" Canadian, Mexican, Hawaiian, and English airports. Although the survey was restricted to not only U. S.

airports, AOPA pilots visiting foreign countries have carefully noted each field and advised their national organizations of the available facilities.

Regarding the foreign ratings, the report stated: "In view of the large number of private pilots vacationing in neighboring countries, and the expanding foreign membership, AOPA has kept it advisable to survey and rate airports outside of the U. S. Domestic airports will continue to receive primary attention." AOPA's report using systems is based solely on the relative superlatives of its pilots.

## Women's Air Show Set For June 1-6 in Miami

Second annual All Women Air Show will be held in Miami June 1 to 6, commemorating the eleventh anniversary of Amelia Earhart's ill-fated island flight this day.

Sponsorship by the Florida chapter of the Ninety Nines, organization of women fliers, was made possible when the Birmingham (Ala.) Aero Club accepted its charter in the date.

Last year's All Women Air Show was held at Peter O. Knight Airport in Tampa. Principal event will be the Amelia Earhart Trophy Race, from Los Angeles to Miami. In addition there will be air debates, singing in Dallas, Tex., Wichita, Kan., St. Louis, Detroit and New York. A light plane cruise to Havana, Cuba, also is in the program. Plans and prices have not yet been announced.

## Breakfast Flight to Open First Federal-Aid Field

The new airport at Twin Falls, Idaho, first to be completed under the Federal Airport Program will be opened officially Aug. 19 with one of a series of state-wide aviation breakfasts.

Other breakfasts planned for Idaho this year: Weese, April 31; Pocatello, May 16; Mackay, June 13; Sun Valley, July 11; St. Maries, Aug. 8; Lewiston, Sept. 15; and Challin, Oct. 18. Los Angeles Chapter of Cessna's seventh annual cross flight, formerly known as the President Flight, will be held May 12. Destination is Carson County's Redwood Field, northwest of Berkeley, and a round-trip will be the order of the day.

## Distributor Named

Western Aero Supply Corp., San Antonio, Tex., has recently been named a distributor for Scott Aviation Corp., and for Evident Batteries, Inc., Reading, Pa.

**Exide**  
AIRCRAFT BATTERIES

LEADERS THROUGH THE YEARS

Exide Aircraft Batteries have seen aviation history in the making. The first battery-equipped plane carried an Exide. Exides were chosen to accompany famous pioneering flights around the earth, over the Poles and into the stratosphere. They served in two World Wars.

In the flying era of today and tomorrow, Exide Batteries will continue to serve with safety and dependability in all types of aircraft from personal planes to giant luxury liners.

Write for copy of Exide Aircraft Battery Catalog, which includes the Exide Battery price and replacement data sheet.

**STUDENTS BUILD "IDEAL PLANE"**

Students of Northern Connecticut Institute are building this personal airplane, and say it is their conception of "the ideal personal aircraft." Configuration follows closely that presented by the "Skykub" (Nassau, Calif.) and "Windward" (Carmichael, Wash.) little experimental designs which failed to gain commercial production.





## Melbourne Letter:

## Australian Air Boom Levels Off While Aviation Fuel Cut Threatens

Dollar insolvency causing concern over lack of replacements, but little talk is heard of possible switch to British planes.

MELBOURNE—Latest traffic returns indicate that the postwar airline boom is beginning to level off, but just beginning. Airlines continue to fly more passengers and freight air mail loads, with only a few exceptions, than in any comparable period before. Even a thousand 20 percent cut in oil fuel allowances to save dollars, can not cut out the latest records because the passenger load factor is now low enough to take care of present loadings if flight schedules have to be reduced.

Australian National Airways last year finished 1949 records, a bonus and profits flow, earned credit lines in many passenger and 24 times as much freight, and earned 10 times as much passenger traffic as in 1939. The airline group 1946 was substantial on all counts despite basic competition from the government-operated TAA service.

The situation point for air freight is not set in view. Shortage of freighter holds had full development in freight service.

▶ **Airline Over Turnover**—State aviation authorities are viewing increasing airline over

the drainage of transport expenditure from airlines to airlines. Four state report agencies receive loads of \$24-million in airline companies. A most of fuel and other materials will be added before June to formulate a national transport policy in which air, rail, road and shipping will be afforded spheres of operation. Of these four markets only railroads are completely government owned, and their increasing share are therefore an incentive on the airlines. It is also held that the postwar development functions that require protection.

While road transport is operating at wartime levels of gasoline rationing, cut airlines has so far got along with out major fuel cuts. Current restrictions have, however, been clamped on charter flights.

A same action aspect of the dollar shortage is that the Commonwealth is not that much better solvent for lack of replacements. Devises of a few Commonwealth and Commonwealth is in process of being used to the full. Australian over looking in the

United States. No order has been placed since the onset of the dollar crisis last August, and none is likely to be issued for some considerable time.

▶ **Little on Switch**—One hears little of plans to switch to British planes. An English aircraft factory representative with the rank of Air Chief Marshal stated in several letters that "certain exceptions" (obviously meaning Avro) could be responsible for the minor that English plane builders can deliver the goods but the only reason for delay was of British inability to deliver planes. As some from Australia government quarters in reply to periodic representations in Parliament as to all legal preferences for American aircraft. The official statements leave no doubt that once possible types are not a middle in England.

The Marshall the secretary the Yaw has publicly pushed Down Under. The interest in setting up office on behalf of British aircraft makers.

No U. S. firm maintains a sales or service organization in the Commonwealth. Except for an occasional handset to one or two local aviation magazines the U. S. aircraft industry is doing little to sell aircraft in Australia. The February sale of Avrocraft sold first time new advertising space in British aviation trade to Americans. The British aircraft industry, consequently, and undoubtedly as represented with big names, with hardworking demonstration flies, with engineers and with publicity, was.

If nevertheless it has not got a far head, in Australia says it, it can be only by the time it is over. Under Britain does not make the type of plans that America with or they cannot be delivered as quickly as it needs them. If they of these delays can be expected to be corrected, and the British aircraft industry in their likely to cash in on the replacement demand which has accumulated as a result of the Commonwealth's inability to keep up production in the U. S.

▶ **Airflight Plans**—London Aero & Motor Services Ltd. has set up a subsidiary in Australia to engage in air flying over a wide area in the Southern Pacific. The firm will focus on specially converted Douglas bombers, operating if occasion demands aircraft from England and South Africa will be devoted to Australia. The bombers have been converted to carry 7 tons of freight with a total capacity of 900 cu ft. Rates are as low as \$1-100 a mile for the complete load. LAMS will operate the freighters on a trip basis.

▶ **Transport Program**—The Commonwealth Transport Commission, created by the Aircraft Production Division of the Department of Munitions,

has created considerable criticism by its dogged adherence to the original post war aircraft production program. It is held that at the present time rate of production the planes will be obsolete before a complete series has left the assembly lines.

One of the types built under the program is the Mustang fighter. It is claimed that the Mustang is of little first-line value today because of its low operational speed of 300 mph. Only 110 have been completed since VJ Day, and CAC is slowly grinding out the remaining 90 to be built under the program.

Also, about ten Mosquito fighter bombers have not to be delivered because the program of 200 is completed. The Mosquito has a speed of 350 mph. The Lincoln bombers were also built but delivery of the 73 Lincoln has order has been speed over six years ending 1952. By that time it will be obsolete, some contend.

▶ **Noose Yaw**—The most up-to-date type in production is the R. R. Noose jet-powered Vampire fighter with a top speed of 340 mph. But not a single unit has been completed, and the program of 90 will not be second up before 1950.

From a defense viewpoint, the danger lies, perhaps in a readiness to rely on Royal Australian Air Force equipment exclusively as the output of the CAC plants. But in an economic regard as aircraft production grows they are an unquestionably performing a vital mission. They provide an efficient means of transport to train out best types of aircraft in large numbers.

Department of Munitions authorities have repeatedly pointed out that Australia has the alternative of continuing as the principal aircraft supplier, facing production "red-tape" or "scrap" along the World War II airplane plants together.

—Hubert Loozick

## Iceland Facilities

International network of existing radio, traffic control and meteorological facilities in Iceland is proposed for a report prepared by the International Civil Aviation Organization. This would extend prior agreement among nations whose airlines fly the North Atlantic.

Estimated cost of the services is \$600,000 annually.

Previously, ICAO assigned for post financing of \$72,000 annually for the maintenance of a Loren sensor in an effort to provide and maintain facilities required for safe operation across the Iceland portion of the northern routes between Europe and the United States and Canada.



BUENOS AIRES AIRPORT TO OPEN IN MAY

Drawing shows overall view of passenger and operations center of the new \$70,000,000 U. S. National Airport of the City of Buenos Aires, presently set for May opening. International passenger reception center is in center foreground. National passenger reception center at top left, first story administration building and control tower top center, and airport postal service building top right. A four-story hotel is shown by the administration building. The airport eventually will have 11 runways and is to accommodate the heaviest type of planes expected in the next few years. Like Midway at New York, it is built on the tropical pattern. The hotel is 15 stories, by superhighway (now being built) from the center of Buenos Aires.

## Scandinavians Fuse Airlines in One Unit

Trans-Atlantic SAS combines office pattern for European operations.

STOCKHOLM—Sweden, Norway and Denmark, have been taking steps to speed complete integration of transport in the cold war era. The latest is a pooling of airplane activities.

What various airlines once into large net month, the Swedish ABA, Danish DDL and Norwegian DNL, are now all unit operating under the common designation Scandinavia Airlines System.

Successful operation of trans-Atlantic routes is the SAS three-company coalition, as well as American companies' pooling of facilities in Europe, may avoid the need, according to SAS press agent Per A. Nørst, as to the original from Atlantic tramp, movement will be in the state of 4-2-3.

▶ **Operation Differences**—Difference between trans-Atlantic and European operations will be in Europe as central executive organ will be created. The three companies will continue as separate units, but will lose their operations.

There will be a common schedule common use of airports and ground facilities and a single sales organization. The clearinghouse (operating flight) with profitable, filed plans, the companies may sign of something like 20 percent of aircraft in case enabling adequate reserves to be kept against crises.

They will help eliminate whatever

such as new company having its plants scattered over a large or amount of big, and inefficient resources available at the home base to take the traffic when the weather closes.

The new arrangement will also permit more extensive use of the existing material. A Danish plane serving in Stockholm in the afternoon, with a scheduled return to Copenhagen the same evening, for instance, can be used for a flight to Gothenburg instead of standing idle all day.

▶ **Better Scheduling**—Scheduling of each particular type of plane will gradually be concentrated at special points, irrespective of the owner. Costs, as well as income, will be pooled, and profits should be 50-50 split.

Greatest advantage of the pooling, perhaps, will be the removal of all from throughout Europe. The SAS trans-Atlantic coalition's office in New York, likewise, will be able to average through programs on the Scandinavian network, between the United States and on point in Europe.

Little saving is envisaged in the form of reduced costs or personnel costs of the passenger and freight handling affairs, but rather an intensification of service and sales after ABA alone will probably save around 100,000 kroner on such use of the common schedule which will now replace the three separate publications.

▶ **Equipment Available**—The extended Scandinavian Airlines System has an impressive array of planes at disposal (including, that is, far three types of transport). In operation are 9 DC-4s, 70 DC-3s, 5 Vickers Vikings, 3 Sverdrup four MLVs, and 6 old Junkers Ju-52s.



"SEA OTTER" TO VENEZUELA

Added to the Royal Dutch Shell Group fleet in South America will be a Vickers Armstrong Ltd. Supermarine "Sea Otter" like that shown above, currently in only five passenger, with enlarged loading hatch to accommodate a motorist out. The plane has been shipped to Venezuela, where it will be used mostly to service survey parties in swamp areas. Craft is powered by a Bristol Mercury engine.



## AIR TRANSPORT

### Mediation Board Chairman Opens Record on NAL Pilot Strike

Frank P. Douglass gives background on dispute in letter to Senator Pat McCarran; peacemaking efforts lag as walkout enters sixth week.

Peacemaking in the National Airlines pilot strike now six weeks old was pushed further into the background last week as Congress was placed on notice to blame for the walkout and an attempt by both parties to carry the struggle through to the bitter end.

More light on the question of blame was thrown on the situation by Frank P. Douglass, chairman of the National Mediation Board, who outlined the company's position in a letter to Senator Pat McCarran (D., Nev.). McCarran had expressed concern over recent rumors which would reflect, if a National Airlines strike would involve a direct incident during the strike.

■ **IAM Move—**McCarran's letter, International Association of Machinists, whose members struck before the pilot walkout on Feb. 7, has asked CMB to direct NAL to comply with the labor provisions of the Civil Aeronautics Act or have its certificate revoked. IAM charged that National had failed since last August to bargain in good faith with the union.

After demanding five delays, the Air Line Pilots Association has, last week, been asked to accept its case in opposition to a CMB proposal to intensify NAL's efforts to settle. ALPA has charged that NAL, contrary to CAA's findings, is not in a critical financial position. It added that the additional aid pay-

ment would be used by the carrier to best the union.

■ **Flight Conference—**With the legal fight over in pay conference, National officials prepared to add new terms to three deals, including with some senior pilots. The carrier hopes to put its DC-8s back in operation on Apr. 1 with one remaining day from one stop before Miami and Newark.

In his letter to McCarran, Douglass said the National Board Chairman Douglass and McCarran will be conducted the NAL strike situation. The Senator, who is regarded as strongly pro-labor, asked Douglass what the mediation board will do to settle the controversy and whether the parties were willing to negotiate.

■ **Position of Board—Douglass'** reply follows:

On Sept. 15, 1945, a NAL pilot, Marion G. O'Neil, Jr., ended up one of NAL's 41 planes and was discharged by the company for the sixth time. ALPA passed on a grievance in this case through the Civil Aeronautics Board. The Board composed of two company members and two pilot members. The grievance was decided by the Civil Aeronautics Board, which was in the position of the NAL pilot, who was discharged by the company for the sixth time. The Board's decision was that the pilot was discharged for the sixth time.

■ **Pact Signer—**Two pilots shortly

of unexplained glare of the parties to dispute of this dispute on the property, the matter became more and more to the attention of the National Mediation Board, whereupon the Board had the parties meet in an office in Washington and, on May 14, 1947, worked out an agreement between the parties that the Mediation Board would name a neutral to sit with the Systems Board of Adjustment to look at the deadlock in this matter. That agreement was entered to writing and signed by the parties in our office.

Subsequently, the Mediation Board named a neutral who is an employee of the Civil Aeronautics Administration. Before the Board was set up, we became convinced that our attempt to employ of CAA as a neutral was a mistake and we requested his resignation, which was given. We thought, however, an actual neutral that we felt had no connection that might be construed as being prejudicial to either party.

■ **Widespread—**Following this, the management of National Airlines advised us that they would refuse to participate in the proceedings unless we named the man originally suggested as a neutral and maintained that position until sometime in November 1947, when ALPA set a strike date on National.

We again requested the parties to come into our Washington office and attempted to get them to agree to go ahead with the handling of the deadlock on the O'Neil case. The carrier requested that, that three neutral be appointed by the President of the United States to sit with the Systems Board of Adjustment to hear and decide the case. Finally, the carrier advised that the President would not participate in such matters, management agreed to take three neutrals to the National Mediation Board.

■ **NAL's Position—**ALPA requested, on its side, that the carrier be allowed only one neutral. Both parties were adamant in this respect. The last offer of the carrier before the other management advised the Board that action that either for three neutrals was accepted by the pilots that afternoon, it was withdrawn and there was no further effort on the part of management to dispose of the O'Neil case. ALPA was in control of the situation, management, and the meeting was concluded.

ALPA withdrew its members from the service of the company at 11 p.m., Tuesday, Feb. 7, 1948. On Wednesday, Feb. 8, we were advised by the carrier through their local attorney that they would agree to the appointment of one neutral to settle the O'Neil case.

■ **New Meetings—**The following day, ALPA agreed with the telephone to go along with that arrangement. The

Mediation Board would the parties, asking them to be in here from Miami and Chicago on Saturday morning, Feb. 7. At the appointed time, David L. Blumstein, president of ALPA, appeared, and management was represented by three attorneys based in Washington.

Management's attorneys at that time advised the Board that management's offer to settle the case as above stated had been withdrawn and, the day before, had discharged all of their pilots and were discharging for other pilots to work their service. We were unable to convince management of the futility of such action or to induce them to go ahead and settle this case on the basis above outlined.

The Board was not advised of the possibility of this strike because the Board felt this strike did not constitute an interrupt continuity to a degree such as to disrupt any section of the country of essential transportation service, and also because we were convinced that management would react that they not participate in any way in settling the facts and, in so doing, would shade by any recommendations of a fact-finding board.

### All American Asks Pickup Suspension

All American Airlines has asked CAA permission to suspend service on part or all of the nonstop pickup routes which it has operated since May, 1945.

The move follows the board's action last month in designating All American for 1150 route of continental routes in the same general Middle Atlantic area now covered by the pickup airline. In selecting AAA to operate the feeder routes, CAA and the new airline would not be designated and designated pickup routes were abandoned.

■ **Company, Attitude—**AAA wants suspension of service on each of its five pickup routes to be effective when application over current routes is made to begin. The company emphasized that the suspension should not be construed as abandonment of the pickup links but only as a suspension lasting for the duration of the feeder service.

CAA has for the past year regarded the AAA pickup system as uneconomical, and has stated publicly that it has not intended to extend the public Post Office Department and the national defense.

■ **Probe Started—**CAA last May authorized an investigation to determine whether the pickup service should be suspended to whole or in part in view of the small traffic potential and the high and persistent necessity to pay for it.



TENDER CARE FOR FRAGILE CARGO

Philco Corporation is using tonight to test its new model television sets from Philadelphia to the West Coast. Two hundred monitors, mostly new, shipped out of Philadelphia last night to Los Angeles via three Bell American C-46s. Entailing for \$575.10 each, the televisions sets moved from case in the lower, loaded "hugle-glass" were transferred from truck to plane.

## Airport Revenue Raisers

New York Port Authority installs vending machines, including one to dispense nylon stockings.

By STANLEY L. GOLBERT

Nylon stockings are helping pay for New York's airports.

Machinists that sell packaged nylon stockings are among 65 new vending devices distributed at local points at LaGuardia Field. This is part of the Port of New York Authority's program to make the airport a profitable venture by exploring every revenue source. The machines net an average of \$1000 a week.

■ **Revenue's Magic Multiplier—**Like a lot of the most spectacular of the Port Authority's revenue-raising methods, but the biggest money makers are LaGuardia's combined refreshment and bars. There are expected to net \$275,000 in 1948—more than double the profit from this source in 1946.

The Port Authority also has opened its complete cafeteria (previously there had been no special dining facilities for LaGuardia's nearly 13,000 employees) and a luncheonette at the international terminal.

■ **Space-Master's Results—**Operating revenues at LaGuardia Field between June 1947 and the end of 1947 were \$152,932 or \$150,000 more than all costs there and at New York International Airport. Revenue-raising methods managed since that time point to an even greater profit for the Port Authority.

operation of the airport. They include:

- Control over automobile parking
- Improvements to the spectator promenade including "plus by play" incidents of arrivals and departures with subsequent about the type aircraft
- Installation of two additional stands on the observation platform
- Six-day week opening of the observation platform at the international terminal
- Dynamic advertising displays (near to those already installed at Washington National Airport)
- Installation of a camera shop at the international terminal in space not utilized before
- Re-arrangement of space at the international terminal to accommodate Pan-Am International Airlines and Colonial Airlines Re-arrangement of space
- A change in conventions at the domestic terminal
- Addition of several foreign flag carriers, including TWA, Swissair, and Sabena
- Construction of abandoned building into space for KLM, Seaboard and Western and TWA
- Plans for Airport Hotel—Although the immediate need at New York International Airport (LaGuardia) is still being space, the Port Authority goes into



NEW TERMINAL IN WEST

Seattle Tacoma Airport will have one of the largest terminals in the country when the \$22,000,000 unit is completed. Foundation of the structure is nearly finished, and ground is being poured in two wings.

ties that it is working on plans for establishment of a hotel.

Post Authority officials point to the results of a recent ATA-PAA Authority poll of passengers using New York's airports, which indicates that the largest number of suggestions from travelers on possible improvements was made for an airport hotel.

**No Change in Opening—**Meanwhile, there is no change in plans to open the \$1.5-billion, six-level, 10-million-sq-ft hotel in July, and no retrofit will be available for operation on opening day. The retirement railway will not be available for structure.

Airlines are expected to start familiarization runs at the new international field sometime next month. CAA has already begun plans for training control tower personnel.

The report will be Number Three in the chain of reports under Post Air La Guardia and Newark. Plans to La Guardia and Newark Field failed when the Navy and the Post Authority could not reach settlement.

#### Shannon Fire

Damage caused by the fire at Shannon Airport, Eire, will cause only slight inconvenience to airline operations.

Much of the essential radioelectric and monitoring equipment has been salvaged from the 74 ft wooden control tower which crumbled to the ground. CAA frequencies were used during the fire for ground to air communications.



KEEPING UP WITH THE "NEW LOOK"

Style changes in women's dresses have brought changes in airline equipment. United Air Lines engineers usually redesigned its landing stairs to place four inches of modern height in the space of three. Borel, a St. Louis firm, is the latest among those firms and flight attendants. On the left a passenger demonstrates the differences introduced with the old type landing stair, while on the right the steps on the new one with ease. The hand will also have been extended.

## Colonial President Flays CAB Policy

One of the strongest anti-airline dissenters against CAB by an airline executive has been made by Colonial Airline President Raymond Jones.

In connection with a meeting to suggest CAB's recent decision in the Middle Atlantic area case (Aviation Week, March 31), Jones charged that U.S. aviation policy, as administered by the presently constituted five-member Board, is just approaching bankruptcy. "I urge Congress, in the course of its current consideration of aviation policy, to investigate the chaotic condition now existing at CAB," Jones declared. He added that the public interest must be protected against what he termed the current inept functioning of the agency.

**Excessive Sues**—"The Board now shows more than just a disposition to favor the large established airlines," Jones stated. "It is forcing the smaller carrier to believe itself and must be dependent on subsidies in the Middle Atlantic area case, Colonial said demand route changes which would have saved the frequent an estimated \$675,000 an yearly simply by connecting our route throughly."

Colonial was charged a route connecting it to terminals Washington and New York. The carrier also was denied a New York-Chicago link, and a Buffalo-Rochester-Syracuse flight to New York-Atlantic City route.

**Two-Minute Decision**—Jones noted that the CAB decision against Colonial's application for a New York-Washington route was approved by two Board members over the strong objection of the third. "Just like 'The coffee pot' will sell out from the Middle Atlantic decision unless CAB grants a stay in order that a case of this magnitude may be decided by a full five-man Board."

Colonial pointed out that shortly before the decision the Post Office Department had asked CAB to take into consideration certain studies which had been made and which affected the act and application submitted in the case. "Failure of the Board to grant the Post Office Department's request may result in an illogical and uneconomic system of air transportation not properly adapted to the needs of the partial service," Colonial stated.

**Post Office Acts**—Concurrently with Colonial's action, the Post Office Department advised CAB to suspend the provisions of the Middle Atlantic area decision pending judicial review of the order. The Department said it has been informed that one or more parties to the case will take CAB's opinion to court, causing the Board to grant reconsideration of the proceeding.

Post Office officials said that once CAB's decision is modified as a result of court review, the department may, capital expenditures and financial resources granted last month will have to be made up through mail pay if the route awards are modified, the partial service would result no benefit for the payee's route.

## Airlines Survey Use Of Airport Facilities

Scheduled commercial airlines last year accounted for only one landing and takeoff in every six at U.S. airports equipped with control towers, according to the Air Transport Association.

A study based on CAA figures covering about 115 fields showed that commercial carriers made only 16.45 percent of the landings and takeoffs, while private firms were involved in 79.51 percent of the operations. The remaining 9.01 percent were by Army and Navy aircraft.

## Planes to China

Tencomen Air Lines has signed a contract with the Chinese government to ferry 118 C-46s from California to Shanghai. Private Overseas Airlines is slated to assist in the movement, which may begin next month. The planes are now being modified at the West Coast.

## Cargo Lines Report Financial Status

See the nation's best-known airline carrier last year and total assets of about \$5,087,000 last fall, including \$1,971,816 worth of flight equipment. Figures as of Sept. 10 showed:

**Air Cargo Transport Corp.**—Current assets \$16,112, flight equipment \$56,816, ground equipment \$54,137, total assets \$221,751, current liabilities \$146,143, capital stock \$497,560, capital and earned surplus \$471,990 (deficit).

**California Eastern Airway**—Current assets \$231,718, flight equipment \$411,007, ground equipment \$55,113, total assets \$991,947, current liabilities \$215,949, capital stock \$165,000, capital and earned surplus \$355,711 (deficit).

**Flying Tiger Line**—Current assets \$628,290, flight equipment \$187,770, ground equipment \$121,070, total assets \$1,616,083, current liabilities \$592,149, capital stock \$735,889, capital and earned surplus \$489,821.

**Mutual Aviation** (Oct. 31)—Current assets \$4281, flight equipment \$1,852, ground equipment \$460, total assets \$31,817, current liabilities \$1,118, capital stock \$28,570, capital and earned surplus \$108,777 (deficit).

**Slack Airway**—Current assets \$3,036, 782, flight equipment \$605,646, ground equipment \$340,772, total assets \$1,530,807, current liabilities \$307,243, capital stock \$1,753,130, capital and earned surplus \$1,257,253 (deficit).

**Wells Air Service**—Current assets \$166,697, flight equipment \$45,500, ground equipment \$25,713, total assets \$251,154, current liabilities \$415,079, capital stock \$194,220, capital and earned surplus \$23,773 (deficit).

## Pioneer Reports Profit Of \$54,224 in 1947

Pioneer Air Lines apparently is the only feeder to end last year in the black, with net earnings of \$54,224. Last years earnings compare with a deficit of \$63,394 in 1946 and a loss of \$1,148 in 1945.

Pioneer, which started service in August 1945 with six routes on a 60-line route, is now on 100 lines, now has a 2,161-mile system extending into New Mexico and including 86 points. President Robert J. Smith said PAA probably will add three DC-3s to its present seven, and increase personnel at its Houston headquarters about 25 percent when the 770 route sales program is in effect by CAB in the next Arizona-New Mexico area decision is settled.

The nation's first feeder line, Pioneer Aviation Week, March 22, 1948

carried 62,000 passengers last year compared to 23,657 in 1946. Mail and express traffic also showed a considerable increase.

## Continental Plans Convair Cargo Rums

Continental Air Lines is studying the possibility of placing one of its new Convair-Lines in cargo service for two months before the craft is used on passenger routes.

This plan, which is in accordance with recommendations made by the President's Air Policy Commission early this year, also has been considered by American Airlines. Continental and American are to take delivery on five 40-passenger Convair-Lines in the spring.

**Commission Suggests**—In its recent report (Aviation Week, Jan. 24), the President's Air Policy Commission suggested that cargo transport be studied regularly on non-passenger schedules for a specified number before passengers are carried. The Commission said the period should be sufficiently long to permit mechanical or design evaluation to become apparent under normal operating conditions.

It was recommended that the test planes be operated day on cargo and night later on passenger service. The Commission acknowledged that the new aircraft and airlines have put new planes through long test periods, but added that events had proved these periods have not been long enough. Concluding of the DC-6s for non-passenger had preceded the carrier's report by less than two months.

**Reaches Used**—Continental has been using its converted 325 bombers to haul freight since the two craft are usually and that even now have been leased to the converted bomber are prepared for almost continuous operation of the new service.

With inauguration of Convair-Lines service, Continental hopes to achieve higher earnings in 1948 than in 1947, according to Robert F. Cox, president. Cox emphasized, however, that 1948 is still dependent to a considerable extent on whether the cost of materials and labor stabilizes during the coming months.

Continental's annual report, issued this month, showed the company with adjusted net income of \$190,458 in 1947 against a net loss of \$1,390 in 1946. A preliminary report (Aviation Week, Feb. 9) had indicated a net profit of \$116,411 last year.

## The data you want COMPLETE CONVENIENT AUTHORITATIVE for new projects



## Flight Testing

For Conventional and Jet-Propelled Aircraft

By RICHARD HARRIS, Project Engineer, Bell Aircraft Corporation

Flight testing and application of the methods of testing are the most important phases of aircraft development. The flight testing of an aircraft is a complex task which involves the use of a variety of specialized equipment and techniques. The flight testing of an aircraft is a complex task which involves the use of a variety of specialized equipment and techniques.

For details regarding the complete details of aircraft testing, see the book "Flight Testing of Aircraft" by Richard Harris, Project Engineer, Bell Aircraft Corporation. \$10.00.

"The first American reference manual of aircraft and data" — AERONAUTICAL ENGINEERING REVIEW

## The work you want • Aircraft Drafting

As Airplane Drafting is a specialized profession, it is one that requires a high level of skill and knowledge. The book "Aircraft Drafting" by R. H. Harris, Project Engineer, Bell Aircraft Corporation, is a comprehensive guide to the field of aircraft drafting. It covers the basic principles of aircraft drafting, as well as the more advanced techniques used in the design and construction of aircraft.

For details regarding the complete details of aircraft drafting, see the book "Aircraft Drafting" by R. H. Harris, Project Engineer, Bell Aircraft Corporation. \$10.00.

## Aerodynamics

As Airplane Drafting is a specialized profession, it is one that requires a high level of skill and knowledge. The book "Aerodynamics" by R. H. Harris, Project Engineer, Bell Aircraft Corporation, is a comprehensive guide to the field of aerodynamics. It covers the basic principles of aerodynamics, as well as the more advanced techniques used in the design and construction of aircraft.

For details regarding the complete details of aerodynamics, see the book "Aerodynamics" by R. H. Harris, Project Engineer, Bell Aircraft Corporation. \$10.00.

## EXAMINE THEM FREE

The American Air, Air Force, and Air Corps. These three books are the most comprehensive and authoritative of their kind. They cover the complete history of the Air Force, from its beginnings in the early days of aviation to the present day.

For details regarding the complete details of the Air Force, see the book "The American Air, Air Force, and Air Corps" by R. H. Harris, Project Engineer, Bell Aircraft Corporation. \$10.00.

Flight testing, Aerodynamics, Aircraft Drafting, and more. For details regarding the complete details of these fields, see the book "Flight Testing, Aerodynamics, Aircraft Drafting, and more" by R. H. Harris, Project Engineer, Bell Aircraft Corporation. \$10.00.

Address: \_\_\_\_\_

City: \_\_\_\_\_

State: \_\_\_\_\_

Country: \_\_\_\_\_









# EDITORIAL

## Careless Pilots Pay

Newspapers throughout the country Jan. 26 reported a Beech Bonanza had been shot down in the air over Salt Lake City, Utah. Some dispatches and the phrase "blew up" in flight, a frequent misnomer. These persons were killed.

Beech Aircraft Corp., which is our opinion a conducting the last continuing safety education program in the industry, has made available to Bonanza owners its preliminary findings on this accident. It was not content to allow the matter to stop with a cursory inquiry of inquiry.

We had not intended in a press announcement, the letter written by Beech's vice president and general manager, John F. Galy, to Bonanza owners is an unusual case of research and reporting for an aircraft manufacturer. Certainly it points again to the penalty nature exacts for foolhardiness.

We have not seen an official government report on this accident, but it seems unlikely that there could be disputes about with evidence reported by the manufacturer indicating that weather on the day of the accident was not unlike except for the most experienced pilots.

The Beechcraft NC 3510GV, took off at 2 p.m. on Jan. 25 from Ogden to fly to Las Vegas under visual flight rules. The pilot, Dean L. Knudsen, had no background of recent flight training or experience, the company reports, and had flown a Bonanza about two hours. He had two passengers.

Approximately 25 minutes later, witnesses on the north side of Salt Lake City based an airplane alternative swirling and queuing in the air, the aircraft was about 1800-2000 ft. above them. At about the third passing, due the airplane broke out at the bottom of the arc, in what appeared to be a high speed power stall. As the pilot apparently tried to pull up the nose, the right wing folded back and hit the fuselage, the complete stall occurred and our section of the fuselage was lined off and the airplane then tumbled in the air, flailing all occupants clear either through the windshield or window. Safety belts were unstrapped in two. Probably all occupants were either killed or rendered unconscious by contact with the inside of the airplane during the tumble, and were delivered to their subsequent fate fall to the ground.

"The tumbling also separated the engine and nose wheel section from the main part of the fuselage."

The company adds these details to point out that "passengers would probably have been seated in the emergency, and to warn all Bonanza owners that any airplane which breaks up at high speed due to overstress and misbehavior will rotate or tumble at such a rate that escape by parachute will be impossible in almost all cases."

The manufacturer adds in its warning letter:

"This accident is a synthesis of weather, pilot error, and aircraft design. It is our opinion that these factors have repeatedly cautioned against in the strongest possible terms, the attempt by an untrained or out-of-control pilot to fly in instrument. Our last letter stated, 'Flight under instrument conditions by untrained or out-of-control pilots is a seriously hazardous and the penalty for this transgression of the CAA regulations, and the loss of nature, it often death, not only for the transgressor but also for his friends who are with him.'"

It thus may please you to state (to Mr. Galy who Beech reports that CAA listed 45 fatal and/or serious accidents in 1946 that were caused by inexperienced pilots flying to fly on instruments.

The manufacturer's findings indicate that the weather was unsuitable for flight because of severe turbulence, snow showers and icing threat, but that even without these problems the accident "could have happened" because of the pilot's lack of experience in instrument flying conditions.

Beaming testimony by at least an experienced pilot has been compiled by the company. Their questions about to the judgment will be the pilot is taking off.

Send a pilot with 16,000 hours—We arrived Ogden (from Salt Lake) at 1:50 p.m. We heard the Ogden tower reporting a flight of NC 3510GV to Las Vegas. I told the pilot to advise the weather at Salt Lake was very squally. Several snow squalls in the valley. I heard the tower inform Mr. Knudsen. . . Mr. Knudsen continued to try out and took off. The air all day was extremely turbulent.

Send a 5000 hour pilot—One day (at two more country flights) returned about 45 minutes before the Bonanza fell. The instructor reported snow squalls and more than moderate turbulence. . . Considering the weather reports and the report of the instructor, we decided to cancel the flight to Delta and return. All instruments in the office that day were cancelled on how foolish these people were in planning to leave. In our judgment, the weather was anything but good for such a flight.

Send another 5000 hour pilot—I had decided that the weather was too bad for me to make a charter flight to Delta about half an hour before Dean Knudsen made his takeoff. Snow showers and extreme turbulence were reported.

Send a pilot with 4500 hours—About 2 p.m. I did make a flight in a Navajo from Ogden to Salt Lake City. On this flight the turbulence was greater than I have experienced for several years at a pilot. Reducing to 100 mph was necessary, which I did from 125 mph to 100 mph. Even at this reduced speed the effects of the gusts upon the airplane were very severe and most uncomfortable.

Send a 1900 hour pilot—Dean he took off I called the tower on the phone to see if Knudsen had checked weather. The tower advised that he had. I then told the tower to find out if he wanted to borrow some parachutes and what kind of down he wanted. . .

Send a 5000 hour pilot—Between 4 and 5:30 p.m. I was in a Piper Cub flying from Provo to Ogden. From Salt Lake we to Ogden the turbulence was very severe. My complete attention was required to handle the aircraft. It was necessary to fly with reduced power and at times to throttle completely back.

Thus, the Beech letter says, it seems clear that the pilot had available for his guidance a wealth of experience, had been chosen to ask advice, and that some of it was offered anyway.

"We recommended that pilots with relatively few hours seek the counsel of old hands who are always ready and willing to help. And that Bonanza owners themselves that good judgment and discussion coupled with a knowledge of the limitations of one's own personal skill be used at all times in connection with weather."

Autopilot on dead, foolish pilots are unnecessary. We have seen no better evidence recently to prove it than this report from Beech.

When it personal aviation goes to launch an industry-wide safety education program that will make available such details, findings and interpretations as these to all pilots?

—ROBERT H. WOOD

## Northwest's Martin 2-0-2's fly with Sperry Gyropilot.\*

Northwest Airlines has joined the most leading airlines that have in their passenger the additional comfort and safety provided by automatic flight. The new Northwest Martin 2-0-2's that fly Northwest's "Overland Route" from coast-to-coast are now equipped with the Sperry A-11 Gyropilot to help the pilot do his job better.

## for smoother travel under all flight conditions...

The Sperry Gyropilot gives the human pilot complete automatically stabilized control of his aircraft at all times. . . enables him to keep his plane proceeding smoothly no matter what conditions of weather. . . lessens his tension and fatigue.

## more passenger comfort and greater schedule reliability

Thus, the Sperry Gyropilot's automatic control of the aircraft brings to passengers the comfort of smooth flight even in rough air. . . to the peak relaxation and higher efficiency. . . to the utmost passenger greater schedule reliability.



\* From News Item 12, 14, 20, 21, 22.



## SPERRY GYROSCOPE COMPANY

DIVISION OF THE SPERRY CORPORATION - GREAT NECK, N. Y.  
NEW YORK - CLEVELAND - NEW ORLEANS - LOS ANGELES - SAN FRANCISCO - SEATTLE

## General Forrest got around



**T**he tactics of General Nathan B. Forrest, famous Confederate cavalry commander, have been studied by military strategists since 1865. Hitler sent Rommel to Tennessee in the thirties to find the secret of Forrest's success. The answer was *speed and mobility*. General Forrest simply got to more places faster than his competitors.

\* \* \*

In today's battle to keep industry rolling at an economic pace, America's leading corporations have found that the nine-place, twin-engined Beechcraft Executive Transport gets their executive staff, technicians and salesmen to *more places faster* than any other means of transportation. They maintain their own schedules.

travel in complete comfort, arrive refreshed and ready for any task!

A note on your letterhead brings an informative brochure on "The Air Fleet of American Business," with full details on the 200 mile-per-hour Executive Transport. Address Beech Aircraft Corporation, Wichita, Kansas, U. S. A.



BEECHCRAFT  
**EXECUTIVE TRANSPORT**  
—MODEL 18—